

## VPDES PERMIT PROGRAM FACT SHEET

This document gives pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **Major, Industrial** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9VAC25-260-00 et seq. The discharges result from the production of nitrocellulose, nitroglycerin, TNT, diethylene glycol dinitrate and propellants, treatment of sanitary sewage and the burning of coal to produce steam and electricity. This permit action consists of updating boilerplate and creating a new stormwater outfall.

1. Facility Name and Address:

Radford Army Ammunition Plant (RFAAP)  
P.O. Box 1  
Radford, VA 24143-0100

Location: State Route 114 North of Radford

SIC Codes:

2821 Industrial inorganic chemicals, oleum  
2869 Industrial organic chemicals, propellant, dinitrotoluene  
2873 Nitrogenous fertilizers, nitric acid  
2892 Explosives, nitroglycerin, trinitrotoluene  
2899 Chemicals and chemical preparations, fireworks  
4911 Electric Services  
4952 Sewerage Systems  
4953 Refuse Systems

2. Permit No. VA0000248      Expiration Date: June 10, 2010

3. Owner Contact: LTC Antonio Munera  
Title: Commanding Officer  
U.S. Army ACO  
Telephone No: 540-639-8711

Operator Contact: Ms. Paige Holt  
Title: Environmental Manager  
Alliant Techsystems Inc.  
Telephone No: 540-639-8658

4. Application Complete Date: September 14, 2009

Permit Drafted By: Kevin A. Harlow WCRO

Date: April 15, 2010

Reviewed By: John D. Cook

Date: 4/27/2010

Public Comment Period Dates: from 5/7/10 – 6/7/10

5. Receiving Stream: New River and Stroubles Creek (outfalls 012, 014)

Basin: New River Subbasin: N/A Tidal: No On 303(d) list? Yes

Section: 2a Class: IV Special Standards: PWS, v

New River critical flows upstream of Outfall 004:

7-Day, 10-Year Low Flow: 559 MGD 1-Day, 10-Year Low Flow: 449 MGD  
30-Day, 5-Year Low Flow: 725 MGD Harmonic Mean Flow: 1520 MGD  
30-Day, 10-Year Low Flow: 646 MGD Tidal: No On 303(d) List: Yes

Critical flows for each outfall are found in the **Attachment B**.

6. Licensed Operator Requirements: Class I
7. Reliability Class: I
8. Permit Characterization:  
( ) Private            (X) Federal            ( ) State            ( ) POTW  
( ) Possible Interstate Effect        ( ) Interim Limits in Other Document (attach to Fact Sheet)
9. Provide a brief description of the wastewater treatment system and provide a general description of the production cycle(s) and activities of the facility.

The Radford Army Ammunition Plant (RFAAP) is an industrial complex operated by a contractor, Alliant Techsystems. In addition to the manufacturing operations, there are two coal fired power plants, three water treatment plants and two sewage treatment plants. About half of the buildings are in standby mode including the continuous automated multi base line (CAMBL) and continuous automated single base line (CASBL), 1st rolled powder, oleum manufacturing, one of the water plants and one power plant. Green Lines A, B and C manufacture solvent based propellant. Currently, the B-line is inactive and New River Energetics (NRE), a subsidiary of Alliant Techsystems, is operating the A-line. This permit is written to authorize discharge from facilities currently in standby mode assuming they may become active.

Most of the manufacturing operations are performed in batches or on a semi-continuous basis. Many are operated continuously to fill storage tanks and then are shut down when the tanks are full. Manufacturing operations that can be performed continuously include nitric acid (ammonia oxidation), nitric and sulfuric acid concentration, nitrocellulose nitration, nitroglycerin, trinitrotoluene and dinitrotoluene and recovery of ethanol and ether by distillation. Nitrocellulose purification is operated in a batch mode.

For ease of keeping track of the facilities, further descriptions are discussed in order by the outfall that receives wastewater. Outfalls are not numbered sequentially. Outfalls have been taken out of service over the years. In order to avoid confusion, outfalls have not been renumbered.

Outfall 004 receives storm water runoff. The former treatment works, which consisted of settling in the main ditch, was cleaned out in 1995. Cooling water was removed from this outfall at the same time. Storm water from the upgradient side of the coal pile is not currently routed to the coal pile runoff treatment system.

Outfall 401 is designated to monitor discharge from the coal pile runoff clarifier. Adjustment of pH and solids removal is provided by this system. This discharge is similar to those listed in steam electric effluent guidelines, 40 CFR 423 for coal pile runoff, as such, permit limits for TSS and pH are continued for this outfall.

Storm water from the following areas will also drain to this outfall: downgradient of the power house, solvent reclamation area, ammonia oxidation plant (AOP), main lab, hospital, employee parking and the solvent recovery area.

Outfall 402 consists of a dry-weather discharge of currently unknown origin, possibly cooling water, groundwater infiltration, or water line breaks that is being investigated. This is an internal outfall to Outfall 004.

#### Outfall 005

Wastewater from nitrocellulose manufacture was removed from the C-line waste acid treatment system in 1994. Wastewater from C-line is routed to the A-B line waste acid treatment system and outfall 007. This treatment system now receives storm water and non-contact cooling water. In the past, this outfall has received wastewater from oleum manufacturing; however, it is doubtful that the plant will ever be started again due to the low price of commercial sulfuric acid. Oleum railcar transfer does occur in this drainage area. To make oleum, elemental sulfur is burned in air to form sulfur dioxide which is then converted to sulfur trioxide. Sulfuric acid is formed when sulfur trioxide is absorbed in water. Additional sulfur trioxide is added to sulfuric acid to form oleum [H<sub>2</sub>S<sub>2</sub>O<sub>7</sub>]. In the past there have been small amounts of elemental sulfur spilled in the rail car unloading area. Storm water from tank dikes is routed to this outfall. On more than one occasion chemical leaks or spills have been directed to this outfall. The C-line waste acid treatment system uses slaked lime to adjust the pH of wastewater. Dual settling basins with wooden baffles treated with chromated copper arsenate (CCA) are provided to increase the basin's retention time. New baffles are added periodically. Sludge has historically been buried in unlined pits adjacent to the river. There are several of these calcium sulfate sludge pits on-site. They are being managed in accordance with an EPA Region III Corrective Action Permit. Currently this is not considered a hazardous waste.

#### Outfall 006

Cooling water and raw water overflow comprise most of the flow through this outfall. Leaks and spills from the power house, and the air compressor house (bldg. 700) also go to outfall 006. Discharges from separators in the green lines hydraulic pump houses have been connected to the bioplant. Oil/water separators are used to treat leaks from all of these except the power house. Discharges into the power house trench drains are similar to those listed as low volume wastes in steam electric effluent guidelines, 40 CFR 423. Floors in the compressor house are mopped with a degreaser weekly, those in the compressor house are hosed down weekly and floors in the power house are dry swept. Separators from vehicle washing discharging to this outfall were removed in 1999.

Storm water from the truck flyash loading area is routed to a small settling basin and then to the A,B-line waste acid treatment plant.

Paved areas of the Green C-Line are washed down once a week in the active areas that drain to outfall 006. Trench drains immediately adjacent to the manufacturing buildings are routed to the bioplant. Wet and dry cyclones are used in the NRE dryers to remove NC and graphite particles. Since the cyclones are not 100% efficient there is the potential for these particles to be exhausted to the atmosphere. Downspouts on the building roofs collect particles and drain to the Bioplant.

#### Outfall 007

Waste acid from the nitric acid concentrator/sulfuric acid concentrator (NAC/SAC) is monitored for

pH and conductivity as it moves toward the A-B line waste acid treatment system. Sodium carbonate is added to the settling basin to buffer the pH above 6.0 if lime did not keep the pH above 6.0. Cooling water for the AOP is routed to this treatment system in case there are acid leaks. Trench drains around the base of the AOP also drain here.

Process wastewater from nitrocellulose (NC) purification, NC nitration and power house blowdowns are treated here as well. Storm water flowing to this unit is limited to that falling on roofs of manufacturing buildings and from the fly ash truck loading area.

Slaked lime is added to the wastewater as needed for pH adjustment. The resulting calcium sulfate sludge is settled in a concrete basin. Calcium sulfate sludge is dredged from equalization basins and placed in an approved offsite landfill.

A multiport diffuser was installed in May 1998. Five of the seven eight inch ports are currently in use. The remaining two ports are being reserved for future expansion.

#### Outfall 012

Outfall 012 receives storm water from the immediate drainage area. The outfall was formerly permitted to accept cooling water; however, this water will no longer flow to this outfall. Cooling water is now in closed loop systems, and in the event of leaks or cooling tower maintenance operations, the cooling water will now be discharged to the TNT Wastewater Pre-Treatment facility and discharged through Outfall 291 and to the Bioplant for treatment. Effluent from Outfall 012 is piped to an intermittent tributary of Stroubles Creek.

#### Outfall 014

Several spring seeps at the foot of the hill between HWMW4 and SWMU "O" feed the discharge. During the April 1999 site visit conducted by Lewis Pillis a fuel oil odor was detected. This was reported to be the result of a large oil leak in 1984, from which the product was never found. Non-contact cooling water was removed from this outfall in 1992, when the process for manufacturing inert gas was changed to a pressure swing operation. Ground water monitoring in this area is required by the facility RCRA Corrective Action Permit.

#### Outfall 017

Storm water from a portion of the open propellant burning area discharges through a small settling pond and outfall 017. Waste propellant, which may contain leaded compounds, is burned once a day in shallow open pans. Ash is collected and disposed of after TCLP testing.

Ground water in this area is being monitored as part of the DEQ-Waste Division ground water monitoring program. A monitoring well is located adjacent to the constructed pond.

#### Outfall 024

Filter backwash and sedimentation basin cleanout from the number 2 water filtration plant is routed to an unlined earthen lagoon. Sodium permanganate and polyaluminum chloride are added to aid in flocculation in the sedimentation basin. No chemicals are added to the settling lagoon. In the past, storm water runoff and ash carrying water from the no.2 power house was also routed to the lagoon. This power house was placed in standby near the end of 1993. Most of the backwash soaks into the ground.

#### Outfall 026

The main sewage treatment plant has a design capacity of 1.0 MGD. It has been operated at significantly reduced flows for the past few decades. The plant consists of two primary sedimentation basins in series followed by a trickling filter, a final clarifier, chlorination and dechlorination. Sludge undergoes anaerobic digestion and drying on open beds prior to being shipped offsite to a RCRA-D landfill. Influent to the main STP comes from restrooms, the plant laundry, vehicle washing and steam cleaning and the main laboratory.

#### Outfall 028

Sanitary wastewater in the horseshoe area was formerly routed to a 0.07 MGD Imhoff tank. However, the treatment system is now deactivated. Due to current population use, septic tanks are now being used to collect sewage from the Horseshoe Area of the plant. In the event usage requirements increase, RFAAP retains the use of this facility. When the facility was operation, a four cell concrete basin was used to provide additional treatment. Chlorine disinfection and dechlorination were also present. Unused filtered water was routinely added prior to chlorination to provide adequate flow for disinfection. Observations for flow are routinely performed to assure the outfall received no flow. Sludge is not routinely removed from the treatment system.

#### Outfall 029

Process wastewater from the manufacture of nitroglycerin (NG), propellant, TNT and DNT and still bottoms from Solvents Area are routed to the bioplant for treatment. Mobile carbon columns are used to pretreat individual waste streams containing 2,4-dinitrotoluene since biological treatment may not completely remove this compound. The bioplant consists of a divided 7 million gallon equalization basin, several banks of rotating biological contactors (RBCs), and secondary clarification. Sludge is aerobically digested and pressed with a plate and frame press.

#### Storm Water Outfalls

There are over 100 storm water outfalls in the manufacturing area of the RFAAP. Sources of pollutants in storm water not already mentioned include controlled and uncontrolled air emissions. Some raw materials are ground or screened and may be emitted through vents. Grinding of 2-nitrodiphenylamine [CAS # 119-75-5], potassium nitrate, potassium sulfate and ethyl and methyl centralite (diethyldiphenylurea) takes place in the B-line area [bldg. 3524] which drains to SW outfall 3E. Potassium chlorate/perchlorate is ground in [bldg. 3691, SW outfall 004] three or four times per year. Exhaust air in these operations is filtered through bag houses. Raw materials are also weighed in the grind house or the mix house. Weigh stations are equipped with exhaust hoods that vent to wet collectors. Fugitive emissions of graphite are generated in the finishing area which is in the drainage area for outfall 3L. Blenders and can packers are fitted with wet scrubbers to remove excess graphite glaze (3I, 3L, 10B). Solvents and nitroglycerin are emitted uncontrolled from multibase propellant dryers in the NRE Area (006). Solvents may be removed from exhaust plumes by storm water falling in the area of the single base solvent system (006).

Sandblasting of painted parts from process lines is conducted in bldg. 4706. Particulate emissions from this are controlled by a cyclone.

Through the Army ARMS initiative several private companies are located on the RFAAP property. Wastewater from these operations, if present, is treated by the on-site facilities.

Table I

NUMBER AND DESCRIPTION OF DRY WEATHER OUTFALLS

Outfall	Source of Discharge (Operations contributing flow)	Treatment Description Unit by Unit	Flow, MGD Long term average
004	Dry Weather Flow (possible cooling water, groundwater, infiltration, or water breaks), Storm Water	None	0.04
005	Cooling water, Oleum wastewater (if operational), Storm water, Nitrocellulose purification pit overflow due to pump and alarm failure	lime pH adjustment, settling	0.39
006	Cooling water, Raw Water Overflow, Storm water, Power House Wash Down	None	13.44
007	NC manufacturing manufacturing and purification, Acid manufacturing and purification, acid reclamation, Powerhouse wastewater	lime or NaCO <sub>3</sub> neutralization, settling	5.554
012	Storm water	None	0.12
014	Spring and SW	None	0.095
024	WTP filter water, WTP overflow, Power plant in standby	Un-lined leaking lagoon (Drinking Water Plant backwash)	0.02
026	Sanitary STP (Design flow = 1.0 MGD) including lab, laundry and cafeteria	Primary sedimentation, Trickling filter, Secondary clarifier, Drying beds, Chlorination, Dechlorination	0.22
028	Sanitary STP (Design flow = 0.07 MGD)	Imhoff tank Sedimentation basin Chlorination Dechlorination	0.025
029	Propellant, TNT, explosives, and munitions manufacturing, solvent still bottoms, storm water	Pretreatment of DNT wastewater, EQ basin, bioplant, settling, aerated sludge plate & frame press, landfill	1.10

**NOTEWORTHY STORM WATER OUTFALLS:**

004 (401)	Coal pile runoff [401]; SW zone B; non-storm water flow [402]	settling and pH adjustment for coal pile runoff
012	SW Zone F	TNT manufacturing area
017	SW zone A, flash area	Settling basin
041	SW zone G	
044	SW zone E	
050	SW zone D	
054	SW zone C	

In the permit application, RFAAP identifies storm water outfalls with an alphanumeric code, important industrial areas are noted below:

- 2A NG1, 1st rolled powder [standby], edge of coal pile railcar unloading, SWMUs 40 [sanitary landfill] and 71 [flash burn metal pipes], water treatment, several springs in NG1 and WTP areas
- 3E NC green line B [standby], part of A-line, chemical grind house
- 3L Blending and packing houses wet cyclones from buildings 1826 and 1876
- 3I part of blend & pack house 1827/1877
- 10F Inactive blend & pack house 1825/1875, part of scrap yard
- 10B-E active or former scrap yards
- 3F outdoor spare parts storage
- 3Q-R outdoor spare parts storage
- 1E 4th rolled powder, jeep refueling area
- 1H,J 4th rolled powder
- 11A SWMU 74 [debris], SWMU 28, 52, HWMU16, spring
- 12A SWMU 27, 29, 53 [ash/industrial landfills] sedimentation basin

A list of the outfall numbers for each zone, along with pertinent comments, is presented below:

Outfall 004 Zone B – coal pile runoff, solvent area, adjacent to power house.

Outfall 012 Zone F – Includes Outfall 012, around the TNT/DNT manufacturing area. This zone now also includes drainage areas 8A, 8B and 8C that were previously included in the set of outfalls represented by Outfall 041.

Outfall 017 Zone A - Propellant Open Burning Ground

Outfall 041 Zone G – All (approximately 120) storm water outfalls not listed elsewhere  
powder/propellant areas:

- 1B 1st rolled powder, locomotive shop yard
- 1E 4th roll powder
- 2A 1st rolled powder, NG1, WTP, closed Sanitary Landfill (SWMU 40)
- 3E lime addition for acid treatment for 005, NC green lines, closed acidic lagoon (SWMU 5)
- 3J propellant finishing, empty drum storage (SWMU F)
- 3L pack houses with air emissions
- 5H finishing
- 5M benite area
- 6A multibased propellant area, former chromic acid treatment area (SWMUs 57,68,69), power plant 2, coal pile, decommissioned bulk fuel oil storage
- 7G ballistics testing
- 15D CASBL

landfills:

- 12 B area near landfills
- 12C area near landfills
- 13A hazardous waste inc., CAMBL, Calcium Sulfate Sludge Drying Bed (SWMU 38), Inert Waste Landfill No. 1 (SWMU 32), closed
- 15B sanitary landfill (SWMU 43), closed, PCB transformer storage building, propellant test burning
- 3W closed acidic wastewater lagoon (SWMU 4) Waste Oil UST (SWMU 75)
- 10A spent battery storage (SWMU P), zinc and copper canister have been removed decontamination area

acid/base operations:

- 3D decommissioned oleum plant
- 3S lime addition for acid treatment for 007

solvent storage:

- 3T bulk solvent storage
- 3V bulk solvent storage

5P-T warehouses, steam condensate from steam heat may be discharged in winter months

Outfall 044 Zone E - 2 outfalls 5Z, ballistics and rocket testing and 15C, ballistics testing  
Outfall 044 discharge sampling is moved from representative drainage area 5Z to drainage area 15C. Numerous efforts to sample the drainage area following heavy rain events have failed. Drainage area 15C should result in collectable, representative samples.

Outfall 050 Zone D - 2 outfalls, previously Zone 11, Outfall 11A 12A  
Closed Hazardous Waste Landfill (HWMU 16)  
Inert Landfill No. 3 (SWMU 52), active  
Activated Carbon disposal area (SWMU 28)  
(sampling point at trib. before the disposal area for ash from burning propellants (SWMU 54),)  
12A: (Formerly outfall 051)  
Calcium Sulfate Sludge Landfill (SWMU 27)  
Fly Ash Landfill No. 2 (SWMU 29), active

Activated Carbon Disposal Area (SWMU 53)

Outfall 054 Zone C - 1 outfall, previously Zone 16, Outfall 16A  
propellant area, zinc canister storage  
Closed Acidic Wastewater Lagoon (HWMU 7)

Storm water outfalls 9AA through 9GG are located away from the manufacturing site and are not considered to be associated with industrial activity and are not part of this permit.

**10. Sewage Sludge Use or Disposal:**

Sanitary sewage sludge is placed on drying beds until dry. The dried sewage sludge is hauled to an approved RCRA-D landfill.

**11. Discharge(s) Location Description:**

A USGS Topographic map is provided as **Attachment A** which indicates the discharge location, significant discharges to the receiving stream, water intakes, and other items of interest.

Name of Topo: **RADFORD NORTH QUAD**

Lat/Long:  $36^{\circ} 11' 6'' / 80^{\circ} 33' 25''$

**12. Material Storage:** Materials are generally stored inside buildings, tanks, sealed containers, or otherwise covered. Coal is stored outside within a diked area.

**13. Ambient Water Quality Information:**

A copy of the flow frequency determination memo for the discharge is included in **Attachment B**. Low flow calculations for the facility are affected by the plant's intake as well as upstream withdrawals. Water Withdrawal Reports are included in **Attachment B**.

Section 2a of the New River is designated as special condition "v", the maximum temperature of the New River and its tributaries from the Montgomery-Giles County line upstream to the Virginia-North Carolina State line is 29 C (84 F). Also, Section 2a of the New River is designated as special condition "PWS" due to RFAAP's (drinking) water intake #2.

The contents of 9 VAC 25-720-130, based on the 1980 SWCB Water Quality Management Plan, indicates that water quality based permit limitations are not needed in this section of the New River to protect the dissolved oxygen standard. According to the WCRO 2008 Water Quality Assessment 305(b) and Impaired Waters 303(d) Reports, RFAAP discharges are located in a segment of the New River that is included on the Part 1 of the 303(d) list of impaired and threatened waters. The impairment begins at the I-77 bridge crossing the New River and extends downstream to the VA / WVA state line. The causes of impairment are PCBs in fish tissue. The PCBs in fish tissue have resulted in a fish consumption advisories. Currently, the source of PCBs is unknown.

**BACKGROUND DATA**

A review of data in the STORET database at river mile 81.72 reveals that there are detectable background concentrations of parameters with an associated water quality standard. A summary of the STORET data for these parameters is included in **Attachment D**.

The 1980 SWCB Water Quality Management Plan indicates that water quality based permit limitations are not needed in this section of the New River to protect the dissolved oxygen standard.

14. **Antidegradation Review & Comments:**

Tier: 1. \_\_\_\_\_ 2. XX 3. \_\_\_\_\_

The State Water Control Board's Water Quality Standards (WQS) (9 VAC 25-260-30) provide all state surface waters one of three levels of antidegradation protection. For Tier I, existing uses of the water body and the water quality must be maintained. A Tier II water body has water quality that is better than the narrative and numeric water quality criteria. Significant lowering of the water quality of a Tier II water is not allowed without an evaluation of the economic and social impacts, as required by Water Quality Standards, 9 VAC 25-260-30. A Tier III water body is an exceptional water body that is designated by regulation. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with the Tier determination. This segment of the New River is listed on Part 1 of the 303(d) list for Fish Consumption Use. The Virginia Department of Health (VDH) has issued a fish consumption advisory for polychlorinated biphenyls (PCBs) for this portion of the New River based on fish tissue collections. However, current guidance indicates that fish consumption advisories do not trigger a Tier 1 designation. In this segment of the New River there are no other impairments and the segment is considered Tier 2 and no significant degradation of existing quality is allowed.

For purposes of aquatic life protection in Tier II waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated.

The antidegradation baseline for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:

"WQS" = Numeric criterion listed in 9 VAC 25-260-5 et seq. for the parameter analyzed

"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

When applied, the antidegradation baselines become the new water quality criteria to prevent significant degradation of the receiving stream. Effluent limits for future expansions or new facilities must be written to maintain the antidegradation baselines for each pollutant. Prior to expansion the antidegradation baselines will be calculated for this facility as described above, in accordance with Guidance Memorandum (GM) 00-2011. Permit limits are in compliance with

antidegradation requirements set forth in the 9 VAC 25-260-30.

**15. Site Inspection Dates: 6/18/09; 7/14/08; 7/19/07**

Performed by: Troy Nipper, Gerald Duff, and Ryan Hendrix

Site inspection report summaries are included in **Attachment C**.

**16. Effluent Screening and Limitation Development**

DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq.). **Attachment D** contains data from STORET Station 9-NEW081.72 located on the New River at Radford, VA. Water quality standards monitoring data, TMP data, daily temperature and pH data, and data from submitted Discharge Monitoring Reports (DMRs) are contained in **Attachment E** along with the antidegradation wasteload allocation spreadsheet and effluent limit calculations. See Table II for outfall limitations.

Critical flows used in calculating water quality standards, waste load allocations and permit limits are included in **Attachment B**. The MIX.EXE program was run to determine the percentage of the receiving stream flow that could be used in the wasteload allocation calculations. Copies of the print outs from the MIX.EXE run are included in **Attachment E**.

The WLA spreadsheet was run for each process wastewater outfall. Once calculated, the acute and chronic WLAs are input into the agency STATS program together with a datum value or analytical results. The STATS program is used to determine whether a limit is needed for the parameter. **Attachment E** contains the spreadsheet used to calculate the stream standards and wasteload allocations and the results of the reasonable potential determination (STATS program) for each parameter.

**NOTE: Outfalls are not numbered sequentially. Outfalls have been taken out of service over the years. In order to avoid confusion, outfalls have not been renumbered.**

Data for toxic parameters is evaluated for all outfalls using guidance memo 00-2011, et seq. According to this guidance, only dissolved metals data can be used to establish metals limitations. However, in the absence of dissolved metals data, total recoverable metals data is used in the reasonable potential analysis to determine whether monitoring for the dissolved is required.

**CONTINUOUS OUTFALLS: 402, 005, 006, 007, 014, 024, 026, 028, 029**

A discussion of permit limitations and monitoring requirements for outfalls 004 and 017 is found in the storm water outfall section of this fact sheet.

Outfalls 007, 026 and 029 discharge within close proximity of each other. Historically this area has been called the "combined outfall area" since the discharges hugged the river bank as they commingled in the river. Effluent from outfall 007 has been discharged through a multiport diffuser into the faster flowing portion of the River thereby preventing commingling.

DMR data for the past 3 years was reviewed to determine long term and maximum average flows.

**Outfall 402:**

Outfall 402 is an internal outfall comprised of the non-stormwater flow to Outfall 004. The source

of the non-stormwater flow is being investigated. The former treatment works, which consisted of settling in the main ditch, was cleaned out in 1995. Cooling water was removed from this outfall at the same time. Monthly monitoring of the non-stormwater flow is to continue. Parameters to be monitored include all those monitored during storm events at Outfall 004, with the same sample type. Oxidized nitrogen is monitored for purposes of determining compliance with the plant-wide limit at Outfall 999. Due to the possibility that the non-stormwater flow is cooling water, temperature will also be monitored monthly with no limit. Monthly monitoring using grab samples is required for all parameters at this outfall.

Data submitted on Form 2C included a quantifiable result for Bis(2-Ethylhexyl) Phthalate. The reasonable potential analysis in **Attachment E** shows that no limit is needed.

Outfall 005:

Effluent guidelines for Organic Chemicals, Plastics and Synthetic Fibers [OCPSF] in 40 CFR 414 were formerly applied to this outfall since wastewater from nitrocellulose [NC] manufacture was routed to this outfall. In 1994, pump capacity was increased to prevent the overflow of NC acidic wastewater to the C-line treatment works. According to the January 26, 1999, letter from the permittee, storm water from the nitroglycerin [NG] area 1 chemical storage tank dike drains were removed from outfall 005 and routed to the bioplant in March 1999. Due to this, OCPSF limits and the whole effluent toxicity [WET] limit were removed from the outfall in the 1999 permit reissuance.

Cooling water, storm water, and wastewater from oleum manufacturing if oleum manufacturing is begun will be discharged to this outfall. Oleum is a form of sulfuric acid. Federal effluent guidelines for sulfuric acid manufacture are found in 40 CFR 415 Subpart U which is reserved.

Best professional judgement/technology-based limitations for sulfate are needed since the permit authorizes discharges from the oleum plant. Sulfate limitations in the current permit are based on two different rationale. Concentration limits were BPJ technology based according to calcium sulfate solubility and mass limits were water quality based to protect human health at the RFAAP No. 2 intake at the one day low river flow in the period of record. Mass limitations for sulfate are carried forward from prior permits. The permittee submitted new information on sulfate solubility with the 2000 permit application, letter of June 26, 1999, that indicates that sulfate solubility is higher than was assumed in previous permitting actions. The maximum solubility of calcium sulfate in water listed in common reference materials is 2980 ppm or 2103 ppm sulfate. Because soda ash is also sometimes used to neutralize waste acid, sodium sulfate may also be present in this discharge. The solubility of sodium sulfate is 50,000 to 488,000 ppm or 33,800 to 330,000 ppm sulfate. Depending on how much caustic is used the sulfate concentration could be much higher than the maximum solubility of calcium sulfate. It is reasonable that the presence of sodium sulfate could cause the discharge to increase in sulfate concentration from 2100 ppm to 3000 ppm. Due to this sulfate concentration limits were increased in the 2000 permit reissuance.

Sulfate loading limits are distributed between outfalls 005 and 007 so that all of the WQS based mass limit for the entire facility cannot be discharged by one outfall.

Data above the QL for iron was reported in the permit application. The need for effluent limitations on these parameters was evaluated (see **Attachment E**) and it was determined that water-quality based limitations for iron is not needed.

A thermal mixing zone was established in the 1980s based on temperature studies performed in the New River in 1985 and 1986 and is continued with this permit.

### OUTFALL 006:

Non-contact cooling water from operations, power house wash down water, storm water, and raw water overflow are discharged to this outfall. The current permit allows for a mixing zone for temperature below outfall 006. This mixing zone is continued in this permit.

Floor drains in the power house may contribute oil from equipment leaks. Coal is spilled from the conveyor onto the power plant roof. During a previous site visit, coal was not being removed and there was evidence that coal was being washed into the roof drains by storm water. Improved best management practices [BMPs] should continue to be employed to assure that oil and coal discharged is kept to a minimum.

Data above the QL is available for iron. An evaluation of the need for a limit for iron was made and it was determined that a limit for this parameter is not needed.

Whole effluent toxicity data is discussed in **Attachment G**. During the previous permit term acute and chronic toxicity data was collected. A compliance schedule for an acute toxicity limit of a TU<sub>a</sub>=1 was included in the 2005 permit. The facility achieved compliance with the toxicity limit within the compliance schedule period. Chronic data collected was analyzed using the WETLIM10 spreadsheet and STATS. Using the chronic data, an acute toxicity limit equal to the current limit of 1.0 TU<sub>a</sub> is needed. No chronic toxicity limit is needed.

### Outfall 007:

Effluent guidelines for Organic Chemicals, Plastics and Synthetic Fibers 40 CFR 414 serves as the basis for setting limits for BOD and TSS. Specifically, cellulose nitrate manufacturing fits into the Thermoplastic Resin subcategory (section 414.40). BAT effluent limitations promulgated in 40 CFR 414 allow for either biological or physical/chemical treatment to be used. Physical/chemical treatment is used by the facility for this outfall.

Flow data and manufacturing information reported by the permittee in the 2003 request for modification was used to establish a long term average flow of 2.562 MGD on which to compute the limits. According to the regulation, this value must exclude cooling water and utility wastewaters. The volume of the flow that is process wastewater should be verified by actual measurements. Effluent limits are calculated as follows:

#### BOD5

Daily Max limit = 64 mg/l x 2.562 MGD x 3.785 = 621 kg/d

Monthly Ave limit = 24 mg/l x 2.562 MGD x 3.785 = 233 kg/d

#### TSS

Daily Max limit = 130 mg/l x 2.562 MGD x 3.785 = 1261 kg/d

Monthly Ave limit = 40 mg/l x 2.562 MGD x 3.785 = 388 kg/d

Daily maximum TSS concentration limits from the current permit, outfall 007, are more restrictive than the BAT limits and will be carried forward into the new permit.

Also applicable to this guideline are the toxic limits in section 414.101. Loading limitations for these toxics are calculated in the same manner as BOD and TSS above. Effluent guideline limitations for metals are expressed as total metals. The concentration values in 40 CFR 414.101 are not concentration limits but are reference data to be used in calculating the minimum effluent guideline loading limits and are to be reported on the DMR.

The pre-expansion chrysene, vinyl chloride, benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene loadings exceeded the human health water quality standards. These pollutants previously had BPJ limits at Outfalls 007 and 029. In order to meet the more stringent water quality based limits, these parameters are limited at the overall Outfall 999 with no limits at the individual outfalls. Nitrobenzene and acrylonitrile loadings were limited to 10% of the assimilative capacity of the stream to maintain compliance with antidegradation requirements set forth in the Water Quality Standard Regulation, 9 VAC 25-260-30. The antidegradation spreadsheet is in **Attachment E**. Monitoring for COD, N-nitroso-diphenylamine and 2,4-dinitrotoluene is continued since these compounds have been seen in the past.

The basis for sulfate limitations is discussed under outfall 005. The same rationale applies to outfall 007 and the concentration limits are increased in the same amount.

Toxicity of sulfates is a concern since a toxicity reduction evaluation (TRE) for this discharge implicated calcium sulfate as one cause of toxicity. The EPA AQUIRE database was searched for toxicity test data from calcium and sodium sulfate. Of the data for *Ceriodaphnia dubia*, the lowest LC50 for these salts was reported to 1910 ppm or 1347 ppm sulfate. With the dilution factor for the outfall 007 diffuser at 8:1, discharges at 3000 ppm would be about 375 ppm, much lower than the LC50 concentration after dilution. It does not appear that increasing the sulfate permit limit to 3000 ppm will result in a toxic discharge. In fact, since sodium sulfate is slightly less toxic to *C. dubia* than calcium sulfate, increasing the sulfate limit may encourage the use of more sodium hydroxide for neutralization while decreasing the toxicity of the discharge.

Oxidized nitrogen limitations were established in the 1980's based on human health criteria for public water supplies. The mass limit for outfall 007 is equal to the mass limit for the entire plant at outfall 999 and are carried forward to this permit.

It is recommended that noncontact cooling water, uncontaminated storm water and ground water not be routed to outfall 007. Increased flows may hydraulically overload the treatment works resulting in poor treatment and making it difficult for the permittee to meet technology based mass limits.

RFAAP has instituted pollution prevention (P2) measures to reduce ammonia discharged to outfall 007. Ammonia is no longer drained to outfall 007 after temporary process shutdowns of the ammonia oxidation plant (AOP). This chemical is piped to the bioplant to be used as a nutrient. Washdowns of the area around the AOP still occur due to the fact that the plant is not enclosed, but are not expected to result in a discharge of significant concentrations of pollutants to the AB-line treatment works. Ammonia remaining in transfer lines when tank cars are unloaded is recovered

and not discharged. Ammonia should be monitored periodically to provide assurance that these P2 measures continue to be effective.

Total recoverable metals data above the QL was reported for copper, iron, lead, manganese, zinc, and chromium. The reasonable potential analysis in **Attachment E** for each of these parameters indicates that no potential to exceed the water quality standards even if all of the metals were in dissolved form. Also, the reasonable potential analysis in **Attachment E** shows that no limit is needed for ammonia.

See the TMP Justification Memo (**Attachment G**) for the rationale for the acute WET limit and TMP monitoring. During the previous permit term acute and chronic toxicity data was collected. A compliance schedule for an acute toxicity limit of a TUa=6.6 was included in the 2005 permit. The facility achieved compliance with the toxicity limit within the compliance schedule period. Chronic data collected was analyzed using the WETLIM10 spreadsheet and STATS. Using the chronic data, an acute toxicity limit equal to the current limit of 6.6 TUa is needed. No chronic toxicity limit is needed.

#### Outfall 014:

Cooling water was removed from this outfall in February 1992 when manufacture of inert gas by pressure-swing absorption began. Currently only spring water and storm water discharge to this outfall. A contaminated spring originates from the base of a hill where a large oil spill/leak occurred in the early 1970s. During a site visit in the spring of 1999, petroleum odors were detected in the spring area. Even though the one sample tested for the permit application did not contain benzene, toluene or ethylbenzene, weathered fuel oil would not be expected to contain these volatile compounds. Due to this diesel range organics including naphthalene should be measured periodically. Water from the spring passes near the former waste acid equalization pond (HWMU 4) prior to entering Strouble's Creek.

High sulfates (196 mg/L) was reported on the June 2009 DMR. The spring has shown to be chronically toxic at times as well. Routine monitoring for these parameters should be performed. Recurring high values should trigger an investigation by the permittee into the contaminant source leading to implementation of best management practices to control pollutant discharges.

In January, 2000, RAAP discovered a collapsed pipe line that was allowing large flows of the contaminated spring to enter outfall 014. Once this was repaired, only minor infiltration of contaminated spring water should enter the pipeline and outfall. The contaminated spring now soaks into the ground forming a small wet area near the inert gas plant. Effluent from this outfall should only be uncontaminated water from a spring upgradient of petroleum storage tanks. However, monthly monitoring is needed to determine if contamination enters the outfall and reaches state waters.

#### Outfall 024:

Water treatment plant backwash is discharged to one of two earthen ponds where the wastewater soaks into the ground or evaporates. This outfall has had only four discharge months since 2005. The Board's standard permit conditions for WTPs are applied - TSS limits (30 mg/l average, 60 mg/l max). Ammonia is generated by bacteria in the pond's sediment. Ammonia limits were

developed in a prior permit action and have become effective.

In October 1994 a ground water assessment was performed for the pond. The ponds are referred to as SWMU 31 in this report. Of those pollutants analyzed in pond sediment only arsenic, beryllium and cobalt exceeded the health based (criteria) numbers [HBNs] used by the consultant. After mathematically mixing estimated leakage from the pond with 1% of the New River, leakage concentrations were compared to estimated WLAs. Ground water monitoring is not required since the estimated concentrations of pollutants outside the mixing zone are at least an order of magnitude lower than the WLAs.

Monitoring for BOD, COD, sulfate and oxidized nitrogen is required since this outfall may discharge in the future and contribute to the plant wide loading. Sludge removal should be addressed in the facility O&M manual.

#### Outfall 026:

Limits for BOD, TSS and pH from the current permit were based on the secondary treatment regulation and are carried forward. The permittee previously requested that daily maximum limitations be used rather than weekly averages for ease of automated computations.

There have been documented pH problems in the STP influent which have resulted in 9 pH violations, all less than 6.0, from 1/89 through 12/90. More recently, influent pH was below 6 at times in April through July 1998. According to the permittee, leaking acid sewers that caused the problem in the early 90s have been repaired. Influent pH monitoring is required to verify that the problem does not recur.

**Ammonia:** The water quality standard for ammonia was revised during the last permit term resulting in a higher calculated ammonia WLA. However, the existing ammonia limit is retained in the new permit to prevent backsliding.

**Chlorine:** The current TRC limits are brought forward and cannot be reduced due to antibacksliding provisions. Standard chlorine limits to verify adequate disinfection for discharges in a public water supply area of 1.5 mg/l are also used.

**Sulfate and Nitrate:** Concentrations of nitrate/nitrite and sulfate are substantially lower than that of outfall 007. Since evaluation of outfall 007 data did not result in the need for water quality based limits for these human health criteria, limits for these pollutants are not needed on outfall 026. Monitoring is required for these since their discharge from this outfall will be included in summary outfall 999.

**Other Toxics:** Chromium, copper, iron, lead, and zinc have been measured above the QL and are evaluated to determine whether permit limitations are needed. According to the program output, limits are not needed for these pollutants.

#### Outfall 028:

The Imhoff tank treatment system is not currently an active facility, as septic tanks are now being used to collect sanitary wastewater. During the 2005 permit there was no flow at this outfall. The

facility can be reactivated if necessary. To monitor compliance with the WQS for nitrate, oxidized nitrogen is monitored at this outfall and limited at outfall 999.

A non-detectable final total residual chlorine (TRC) limit was previously placed on this outfall as a result of failing TMP tests on effluent that was not dechlorinated. In addition, TRC could be discharged from outfall 026, and the Pepper's Ferry and Blacksburg/VPI STPs. Numeric limitations instead of a nondetectable limit were then placed on the discharge during the last permit reissuance to conform to the recommended agency guidance. The current limit is more restrictive than the maximum limit from WLA spreadsheet and STATS and cannot be reduced due to antibacksliding provisions of the Clean Water Act. Standard chlorine limits to verify adequate disinfection for discharges in a public water supply area of 1.5 mg/l are also used.

### Outfall 029:

Process wastewater from several different industrial processes is conveyed to the bioplant for treatment. To properly determine effluent limitations for outfall 029 it is necessary to define each flow contribution and apply appropriate limitations to each different type of wastewater.

Wastewater from the following operations flows to the bioplant and outfall 029:

- A. Nitroglycerin (NG)(2 plants) and diethylene glycol dinitrate (DEGDN) manufacture (0.061 MGD)
- B. Propellant manufacture, includes triethylene glycol (TEG) transport water (0.856 MGD)
- C. Solvent recovery, still bottoms, building and equipment washdown (0.11 MGD)
- D. Miscellaneous operations:
  - 1) cooling tower blowdown from alcohol reclamation and single base solvent propellant
  - 2) cooling water from NG2 and single base solvent propellants (if needed)
  - 3) steam condensate from NG2, single base solvent propellants, solventless propellants and New River Energetics (0.001 MGD)
  - 4) ammonia from AOP, used as a nutrient
  - 5) incinerator scrubber water and cooling water sump could be drained to the bioplant if needed, but are not proposed to be discharged in the permit application.
  - 6) Lab wastes, commercially available bioaugmentation product, etc. used as nutrients (0.001 MGD)
  - 7) NC degradation decant added (0.002 MGD)

#### A. NG and DEGDN production:

Effluent guidelines in 40 CFR 457 are applicable to nitroglycerin manufacture which contributes wastewater to the bioplant. Limits are based on production. The permittee has stated in the application that 9,000 lbs/day of nitroglycerin is an actual measurement of production. Limits are calculated as follows:

#### COD

$$\text{Daily Maximum} = 7.77 \frac{\text{lb}}{1000 \text{ lb}} \times 9.0 \frac{(1000 \text{ lb})}{\text{day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} = 31.80 \text{ kg/d}$$

$$30 \text{ Day Average} = 2.59 \frac{\text{lb}}{1000 \text{ lb}} \times 9.0 \frac{(1000 \text{ lb})}{\text{day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} = 10.60 \text{ kg/d}$$

#### BOD5

Daily Maximum = 0.72 lb x 9.0 (1000lb) x 1 kg = 2.95 kg/d  
1000 lb day 2.2 lb

30 Day Average = 0.24 lb x 9.0 (1000lb) x 1 kg = 0.98 kg/d  
1000 lb day 2.2 lb

**TSS**

Daily Maximum = 0.25 lb x 9.0 (1000lb) x 1 kg = 1.02 kg/d  
1000 lb day 2.2 lb

30 Day Average = 0.084 lb x 9.0 (1000lb) x 1 kg = 0.34 kg/d  
1000 lb day 2.2 lb

B. Solvent recovery:

Still bottoms from ethanol and ether distillation are conveyed to the bioplant. Ethanol production specifically falls under the Commodity Organic Chemicals subgroup of the Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) guidelines in 40 CFR 414. Distillation is considered by EPA as one of the major generalized chemical reactions and processes of the OCPSF industry. Therefore wastewater from the recovery of ethanol is considered to be applicable to these same limitations. Long term average flows have been carried forward from the previous permit. OCPSF flows were reported for 3 years during the present permit and will be reported with the next application for permit reissuance.

Effluent limitations are calculated as follows:

Commodity Organic Chemicals: (Solvent recovery)

**BOD5**

Daily Maximum limit = 80 mg/l x 0.11 MGD x 3.785 = 33.3 kg/d

Monthly Average limit = 30 mg/l x 0.11 MGD x 3.785 = 12.49 kg/d

**TSS**

Daily Maximum limit = 149 mg/l x 0.11 MGD x 3.785 = 62.03 kg/d

Monthly Average limit = 46 mg/l x 0.11 MGD x 3.785 = 19.15 kg/d

C. Propellant manufacture:

Specific effluent guidelines for propellants manufacture have been reserved by EPA in 40 CFR 457, subpart B. All propellants manufactured at RAAP contain nitrocellulose.

BPJ concentration and mass limits were developed for the bioplant in March 1986, based on 80% removal of COD and BOD by the bioplant. The BPJ concentration limits are carried forward to this permit and should be easily achieved.

The OCPSF development document places propellant manufacture in the same subcategory as

nitrocellulose manufacture (separate from nitroglycerin and TNT). Propellants made at RAAP contain plasticizers, are formed and extruded as plastics and thus may be considered plastics. Propellant manufacture uses ethanol in processing so that the wastewater is similar to that from ethanol manufacturing. Effluent guidelines for the thermoplastic resins subgroup of the OCPSF guidelines, specifically cellulose nitrate, appear to be the most appropriate basis for developing limitations for propellant manufacturing wastewaters. In the OCPSF development document, page III-25, EPA makes the following statement:

"The Agency does note, however, that the OCPSF manufacturing processes are essentially identical regardless of how manufacturing facilities may report OCPSF production to the Bureau of the Census. Therefore, the OCPSF technical data base and effluent limitations and standards provide permit issuing authorities with technical guidance for establishing 'Best Professional Judgement' (BPJ) permits for OCPSF production activities to which this regulation does not apply."

Discharges from the loading, assembly and packaging (LAP) of propellants for military charges are similar to those from propellant manufacturing. Flow from these operations is small (< 0.001 MGD) and is limited to washdown and fire sprinkler operation. Wastewater from these operations is estimated to make up less than 0.1% of the influent flow to the bioplant. Limitations from the OCPSF regulations are applied to these discharges.

Effluent guidelines for explosives (in A. above) limit only COD, whereas, OCPSF regulations limit BOD only. To account for these differences, the BOD/COD ratio for effluent from this outfall is used to establish COD limits for OCPSF discharges and BOD limits for explosive discharges.

NG wastewater flow (0.061 MGD), still bottoms flow (0.11 MGD) need to subtracted from the long term average flow (LTAF), to calculate loadings subject to the thermoplastic subcategory since separate calculations have been made to determine loadings from these sources and no allocation is made for cooling water and steam condensate estimated at 0.001MGD.

Subtractions from LTAF =  $0.061 + 0.11 + 0.001 = 0.172 \text{ MGD}$

Adjusted LTAF =  $1.028 - 0.172 = \underline{0.856 \text{ MGD}}$

To be used for thermoplastic subcategory

LTAF for toxic pollutants in 40 CFR 414.91 =  $1.028 - 0.061 - 0.001 = \underline{0.966 \text{ MGD}}$

Thermoplastic Resin (nitrocellulose [NC] and NC propellants):

**BOD5**

Daily Max limit =  $64 \text{ mg/l} \times 0.856 \text{ MGD} \times 3.785 = 207.35 \text{ kg/d}$

Monthly Ave. limit =  $24 \text{ mg/l} \times 0.856 \text{ MGD} \times 3.785 = 77.76 \text{ kg/d}$

**TSS**

Daily Max limit = 130 mg/l x 0.856 MGD x 3.785 = 421.19 kg/d

Monthly Ave limit = 40 mg/l x 0.856 MGD x 3.785 = 129.59 kg/d

D. Other flows:

Cooling water and cooling tower blowdown noted in items 1) through 3) are authorized to be discharged to the bioplant, but are not considered process wastewater. These flows were subtracted from the effluent flow to determine the long term average flow for calculation of OCPSF limitations for propellants.

Ammonia is used as a nutrient by microorganisms in the bioplant to degrade organic pollutants. One source of ammonia is directed to the bioplant from the ammonia oxidation plant (AOP) when ammonia lines are drained as the result of a temporary process shutdown (item 2). This is a good use for ammonia that would otherwise be wasted and is authorized by the permit.

LOADING LIMITATION SUMMARY = NG + Solvent recovery + Propellant

Technology based BOD Daily maximum limit = 2.95 + 33.3 + 207.35 = 243.6 kg/d

Technology based BOD Monthly average limit = 0.98 + 12.49 + 77.76 = 91.23 kg/d

Technology based COD Daily maximum limit = 31.80 + NA + NA = 31.80 kg/d

Technology based COD Monthly average limit = 10.60 + NA + NA = 10.60 kg/d

Technology based TSS Daily maximum limit = 1.02 + 62.03 + 421.19 = 484.24 kg/d

Technology based TSS Monthly average limit = 0.34 + 19.15 + 129.59 = 149.08 kg/d

To account for the fact that the OCPSF guidelines do not limit COD, the COD limit is recalculated from the BOD limit above and an historic effluent COD/BOD ratio of 3.50 that was used for limit development in the previous permit. This number was calculated by the permittee using about 170 paired data sets. This compares very well with the ratio calculated from average data reported on DMRs.

Calculated BPJ COD Daily Maximum limit = 243.1 x 3.50 = 852.6 kg/d

Calculated BPJ COD Monthly Average limit = 91.06 x 3.50 = 319.3 kg/d

Toxics limitations from the OCPSF guidelines are included on outfall 029, as required by 40 CFR 414. Data from past monitoring indicates that most of the toxics are less than the detection limit. Monitoring for these compounds remains at the same frequency as in the prior permit. N-nitrosodiphenylamine monitoring is continued in this permit since it has been previously detected in effluent.

Thermal limitations, as BTU/day, which replaced the temperature limit at outfall 029, have been carried forward. Mixing zone studies performed in 1995 showed that temperature quickly dissipated with almost no area of the river exceeding the temperature WQS. The limit is equal to the highest thermal load discharged since the new covered equalization basins were completed in November 1995. Data prior to this is not considered representative of thermal

load since covering the basins reduced solar heating of the wastewater.

The explosives development document recommends pretreatment for discharges high in sulfate, TNT or NC fines. The facility previously pretreated NG wastewater does not currently because NG concentrations are manageable in the Bioplant complex. However, capabilities and readiness to pretreat NG wastewater in the event of a process upset or unusual circumstances still exists.

Influent monitoring is recommended for BOD, COD, and TSS since the treatment works has been subject to overloading in the past and the treatment efficiency is dependant upon varying propellant formulations and operation of the equalization basins. This will also help in establishing operational controls for the plant.

The pre-Outfall 007 expansion chrysene, vinyl chloride, benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene loadings exceed the human health water quality standards. These pollutants previously had BPJ limits at Outfalls 007 and 029. In order to meet the more stringent water quality based limits, these parameters are limited at the overall Outfall 999 with no limits at the individual outfalls.

#### Limits for WQS Pollutants:

Detectable data above DEQ's quantification level (QL) is available at this outfall for the following WQS pollutants: 2,4-Dinitrotoluene, Copper (Tot), Lead (Tot), Nickel (Tot), Zinc (Tot), and Chromium (Tot). The reasonable potential analysis in **Attachment E** indicates that no limits were needed for these parameters. The analysis for the total recoverable metals was performed to determine if there is a need for monitoring of the corresponding dissolved metal.

Propellant formulations can include the following compounds:

<u>Pollutant</u>	<u>CAS no.</u>	<u>toxicity information available</u>
copper compounds		
cyrolite	1509-65-23	ACQUIRE
ethylcellulose	9004-57-3	
ethyl centralite	85-98-3	
(N,N=-diethyl-N,N=-diphenylurea)		ACQUIRE
dibutyl phthalate*	84-74-2	WQS
diethyl phthalate*	84-66-2	WQS
diethylene glycol	111-46-6	ACQUIRE
diethylene glycol dinitrate (DEGDN)	639-21-0	ACQUIRE
di-normal-propyladipate	106-19-4	
2,4-dinitrotoluene* (DNT)	121-14-2	WQS
diphenylamine (DPA)	122-39-4	ACQUIRE
glyceryl triacetate (triacetin)	102-76-1	ACQUIRE
lead compounds		
methyl centralite	611-92-7	
2-nitrodiphenylamine (2NDPA)	119-75-5	
nitroglycerin (NG)	55-63-0	ACQUIRE, US Army
nitroguanidine (NQ)	556-88-7	US Army

OCPSF regulations establish limits for diethyl phthalate, dibutyl phthalate and 2,4-dinitrotoluene (noted with a \* above).

Effluent from outfall 029 did not exhibit whole effluent toxicity during this permit term. The acute whole effluent toxicity limit of 1 TUa is carried forward. Monitoring frequency remains the same due to process variability and previous toxicity at the outfall.

Outfall 291 (internal to outfall 029):

Most of the wastewater expected to be generated from TNT manufacturing operations is expected to be neutral pH (6.0 – 9.0). This wastewater will be discharged to the TNT Wastewater Pre-Treatment facility. In the event acidic wastewater is generated from the area, the wastewater will be neutralized prior to final treatment at the Bioplant. Process wastewater from the manufacture of TNT or DNT is expected to result in the discharge of trace amounts of 2,4-dinitrotoluene (DNT), however, the wastewater will be processed through diatomaceous earth filters and columns packed with granular activated carbon (GAC).

The BPJ limit for TNT nitro bodies is applied to this outfall whenever TNT or DNT is manufactured. The limit, incorporated into the facility's VPDES permit in 1979, is based on 85% removal efficiency of the carbon columns while operating at full capacity. The flow used to convert limits from concentration to mass was 0.46 MGD. Copies of pages of the 1979 fact sheet which refer to this are in the **Attachment F**. The discharge is expected to be intermittent and the flow is to be estimated once per discharge week.

TNT nitro bodies may be analyzed by method SW-846 8330 or other EPA or DEQ-approved method. The following is a list of potential components of the TNT nitro bodies: 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, 2-4-6-trinitrotoluene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-dinitrotoluene, 4-nitrotoluene, HMX, RDX, nitrobenzene, and tetryl. TNT nitro bodies are to be monitored once per discharge week using a grab sample.

Pursuant to backsliding provisions of the Clean Water Act, permit limits for TNT nitro bodies from the current permit are carried forward into the new permit.

Outfall 999:

For several parameters, the total mass discharged from the facility is critical. This is true for pollutants which are regulated to protect human health from toxic effects through drinking water. RAAP operates a drinking water intake on the New River on the downstream end of the plant site. Based on the analysis on accompanying pages, the total mass discharged of the following parameters is limited:

**BOD, TSS, and COD** - The current permit limits these parameters. The limits are carried forward. The sample type and frequency at each outfall is given on the respective outfall EL page.

**Oxidized Nitrogen** -The current permit limits this parameter. The instream drinking water standard of 10 mg/l of Nitrate-N must be met at low flow. Nitrate due to other dischargers in the area is possible. This was previously discussed in the fact sheet.

**Sulfate** - The current permit limits this parameter. The instream PWS human health WQS of 250 mg/l must not be exceeded.

Data from the following outfalls should be used in computing the summaries: 402, 005, 006, 007, 014, 024, 026, 028, and 029.

**Chrysene, vinyl chloride, hexachlorobenzene, benzo(a)pyrene, benzo(a)anthracene, and benzo(k)fluoranthene** were previously limited by the minimum effluent limit guidelines in 40 CFR 414. However, the combined loadings at Outfalls 007 and 029 exceed the PWS human health water quality standards for these parameters. Therefore, these parameters are now water quality limited at Outfall 999 with monitoring at Outfalls 007 and 029.

Storm Water Outfalls:

RAAP should rotate monitoring between outfalls within a zone to determine whether new zones are necessary. Areas at the Dublin site previously designated as Zone 9 are used for propellant storage. This zone is excluded from storm water permitting since all propellants are stored in drums in closed bunkers. Fields in this area are used for agricultural purposes, under contract to a local farmer. Fields have been sprayed with herbicide to reduce the amount of thistle. Since this is an agricultural practice, it is not considered an industrial activity.

Storm water monitoring data is compared to EPA benchmark values from the multisector general permit, the water quality standard (WQS) criteria and the monitoring cut-off concentrations from Virginia's general permit for discharges of storm water associated with industrial activity, 9 VAC 25-151-10 et seq., hereafter known as the "general permit".

Data in the permit application shows the following parameters above the benchmarks, twice the acute WQS or above the general permit monitoring cut-off concentrations for chemical and allied product manufacturing sites. Use of the DEQ SW permit is justified since the requirements were developed for similar facilities. Data for fecal coliforms in storm water is considered to be indicative of the presence of wildlife that is abundant at this site.

<u>Outfall</u>	<u>Parameter</u>	<u>Comparative Value</u>
Outfall 017	Total Suspended Solids	100 µg/L
	Copper, dissolved	22 µg/L
	Lead, dissolved	170 µg/L
	Zinc, dissolved;	190 µg/L
Outfall 041	Total Suspended Solids	100 µg/L
	Oil and Grease	15 µg/L
Outfall 044	Total Suspended Solids	100 µg/L
	Oil and Grease	15 µg/L

All areas should be included in the Storm Water Pollution Prevention Plan. Monitoring is required in specific industrial areas based on the industrial activity in that area. Depending on wind conditions, fugitive dust and air emissions from one area may enter adjacent areas. For this reason, all data was compared to the comparative values. Monitoring is not needed on storm water from landfills that have vegetative cover and are properly closed out. Monitoring for

outfall 017 is limited to only those parameters that have the potential to be present. In addition to monitoring, quarterly visual examination of storm water quality should be required for all areas of industrial activity. Should any of the monitoring benchmarks be exceeded or the visual examination be atypical, then the facility SWPPP should be examined to determine whether pollution prevention, maintenance or additional controls are needed to reduce the level of pollutants in storm water.

When there is more than one outfall in a zone, monitoring should be rotated among the outfalls. Monitoring for storm water outfalls that drain areas of less than one acre is not considered as important as monitoring larger drainage areas. This is applicable only as long as these small areas are not considered to be directly associated with industrial activity. Areas of the plant that are being used actively should be given priority for monitoring over areas that have been shutdown.

#### Outfall 004:

Treatment for solids and pH for runoff from the coal pile runoff is present and permitted as outfall 401.

Storm water monitoring data above the required quantification level [QL] is available for dissolved Chromium VI. The result of 3.0 ug/L is less than twice the acute standard, or 32 ug/L. Monitoring for this parameter is not required during the permit term.

EPA selected the median concentration from the National Urban Runoff Program as the benchmark for total suspended solids (TSS) and nitrate plus nitrite ( $\text{NO}_3/\text{NO}_2$ ). EPA believes the median concentration, which is the mid-point concentration represents concentration above which water quality concerns may result and as a level below which there is little potential for water quality concern. Areas of industrial activity are similar to urban areas in their potential for TSS discharge, but are not similar for discharges of  $\text{NO}_3/\text{NO}_2$  when large coal burning facilities are located on the industrial site. The benchmark for  $\text{NO}_3/\text{NO}_2$  for this permit is adjusted for atmospheric deposition of  $\text{NO}_3/\text{NO}_2$  that is formed from NOx in stack emissions. The mean value of  $\text{NO}_3/\text{NO}_2$  deposited in samples from all of Virginia's deposition monitoring stations for a five year period (of 1.08 mg/l) is added to the value from the urban program (of 0.68) to arrive at a site specific  $\text{NO}_3/\text{NO}_2$  benchmark value of 1.76

Monitoring for nitrate and sulfate, which have historically been found in the discharge, will continue. Limitations for pH are carried forward from prior permits

#### Outfall 401:

The outfall and treatment works was created to remove solids and provide pH adjustment. TSS and pH limits are similar to those listed in steam electric effluent guidelines, 40 CFR 423 and are applied to this outfall.

#### Outfall 012:

This outfall receives storm water from TNT manufacturing areas. Storm water monitoring data above the required quantification level [QL] is available for dissolved Chromium VI. The result of

2.0 ug/L is less than twice the acute standard, or 32 ug/L. Monitoring for this parameter is not required during the permit term.

#### Outfall 017:

Storm water from part of the open burning ground flows through a small detention pond prior to discharge to the New River. Storm water will also infiltrate into ground water and migrate into the New River through the ground.

Monitoring for TSS, dissolved lead and copper is needed to minimize discharge of these pollutants to the River. These metals are selected since they are ingredients in propellants manufactured at RFAAP. The need for additional BMPs must be evaluated whenever the EPA benchmarks or two times the acute WLA are exceeded. The comparative value to be used in determining whether the BMPs must be re-evaluated or amended are as follows: 22 ug/L for copper, 174 ug/L for lead, 100 mg/L TSS.

#### Outfall 041:

Storm water monitoring data above the required quantification level [QL] is available for dissolved Chromium VI. The result of 3.0 ug/L is less than twice the acute standard, or 32 ug/L. Monitoring for this parameter is not required during the permit term. Monitoring for TSS and Oil & Grease is continued. One result for TSS of 300 mg/L was reported on the DMR for December, 2009. TSS and oil & grease are included in the annual storm water management evaluation.

#### Outfall 044

Monitoring for TSS and Oil & Grease is continued. One result for TSS of 421 mg/L was reported on the DMR for June, 2006. TSS and oil & grease is included in the annual storm water management evaluation.

#### Outfall 050

A spring originating near the closed HWMU 16 discharges to the New River at this outfall location. Storm water data commingled with the spring has been reported as outfall 050 on DMRs. Lead was detected at the concentration of 31.2 ug/L at Outfall 050 on the December, 2003 DMR. The results during the 2005 permit term have been less than this value. Semi-annual monitoring will continue for this permit term

#### Outfall 054:

Storm water monitoring data above the required quantification level [QL] is available for dissolved Chromium VI. The result of 2.0 ug/L is less than twice the acute standard, or 32 ug/L. Monitoring for this parameter is not required during the permit term.

#### Storm Water Management Requirements

Included in the permit are General Storm Water Management and General Storm Water Pollution Prevention Plan (SWPPP) requirements. Additionally, there are Site Specific SWPPP

Requirements that address certain categories of industrial activities: Chemical Manufacturing Areas; Land Application Sites and Open Dumps; Steam Electric Power Generating Facilities, Including Coal Handling Areas; Treatment Works; and Transportation Facilities.

17. **Antibacksliding Statement:**

All limits are at least as stringent as in the previous permit.

18. **Compliance Schedules:**

No compliance schedule is included in the permit.

19. **Special Conditions:** A brief rationale is given for each special condition contained in the permit.

a. **Additional TRC Limitations and Monitoring Requirements at Outfall 026 and Outfall 029 (Part I.B.1)**

Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection..

b. **Notification Levels (Special Condition I.B.2)**

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 A for all manufacturing, commercial, mining, and silvicultural dischargers.

c. **Compliance Reporting under Part I.A (Part I.B.3)**

Rationale: Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

d. **EPA Industrial Reopener (Part I.B.4)**

Rationale: Required to implement 9 VAC 25-31-220 C, 40 CFR 122.44 requires all permits for primary industrial categories to include the requirements of Section 307 (a) (2) of the Clean Water Act.

e. **Storm Water Reopener – (Part I.B.5)**

Rationale: Section 402 of the Clean Water Act limits the discharge of industrial storm water pollution and establishes a framework for developing permits over time based on a 4 tier set of priorities. Allows modification of the permit to reflect future storm water regulations.

f. **Sewage Sludge Reopener (Special Condition I.B.6)**

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-220 C for all permits issued to treatment works treating domestic sewage.

**g. Nutrient Enriched Waters Reopener (Special Condition I.B.7)**

Rationale: Policy for Nutrient Enriched Waters, 9VAC25-40 allows reopening of permits for discharges into waters designated as nutrient enriched if total phosphorus and total nitrogen in a discharge potentially exceed specified concentrations. The policy anticipates that future total phosphorus and total nitrogen limits may be needed.

**h. Water Quality Criteria Reopener (Special Condition I.B.8.)**

Rationale: VPDES Permit Regulation, 9VAC25-31-220 D requires effluent limitations to be established which will contribute to the attainment or maintenance of water quality criteria.

**i. Total Maximum Daily Load (TMDL) Reopener (Special Condition I.B.9)**

Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

**j. 95% Capacity Reopener (Special Condition I.B.10.a)**

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits.

**k. Indirect Dischargers (Special Condition I.B.10.b)**

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

**l. CTO, CTC Requirement (Special Condition I.B.10.c)**

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790.

**m. O&M Manual Requirement (Special Condition I.B.10.d)**

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9VAC25-31-190 E.

**n. Reliability Class (Special Condition I.B.10.e)**

Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790 for all municipal facilities.

**o. Materials Handling/Storage (Special Condition I.B.11)**

Rationale: 9VAC25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

**p. Excursion time for pH (Special Condition I.B.12)**

Rationale: This Pursuant to 40 CFR 401.17(b), excursion times can be allowed for continuous monitoring of technology based pH limitations. These excursions are applicable only to outfalls with well maintained treatment systems which monitor pH continuously. Limitations for pH at outfalls 007 and 029 are based on federal effluent guidelines. Outfall 005 and Outfall 006 are given excursion time even though this is a water quality based limit. Excursion time is allowed to account for those times when continuous pH monitoring equipment may

malfuction. Instream water quality standards for pH should be met once discharges mix with the receiving stream. If individual excursion time exceeds the time limit then the receiving stream should be observed to see if environmental damage is visible. Environmental damage assessment should be reported with the violation notification.

q. **Conceptual engineering report (CER) (Special Condition I.B.13)**

Rationale: Modifications to Outfall 017, potentially including the drainage area, settling basin, and spillway are planned. Section 62.1-44.21 of the State Water Control Law requires owners to submit information as necessary to allow the staff to determine the effect of the discharge on the quality of state waters. A CER should be submitted to justify the size of the basin. Modifications to the flow patterns or basin size, if necessary, should conform to specifications in the Virginia Erosion and Sediment Control Handbook.

r. **Best Management Practices Plan (Special Condition I.B.14)**

Rationale: VPDES Permit Regulation, 9VAC25-31-220 K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

s. **Operations and Maintenance (O&M) Manuals (Special Condition I.B.15)**

Rationale: Required by Code of Virginia § 62.1-44.16; VPDES Permit Regulation, 9VAC25-31-190 E, and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O&M manual ensures this.

t. **Sludge Use and Disposal (Special Condition I.B.16)**

Rationale: VPDES Permit Regulation, 9VAC25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

u. **Licensed operator (Special Condition I.B.17)**

Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

v. **Cooling Water and Boiler Additives (Special Condition I.B.19)**

Rationale: This condition is similar to that specified for steam electric power plants and is present in the current permit. Since this facility generates electricity this condition remains in the permit. Organic additives may substantially increase the biochemical oxygen demand of cooling tower blowdown. The facility should consider routing this wastewater to a biological treatment system. Chemical additives may be toxic or otherwise violate the receiving stream water quality standards. Upon notification, the Regional Office can determine if this activity will warrant a modification to the permit.

w. **Daily inspections (Special Condition I.B.20)**

Rationale: A person familiar with Federal and State Water Control Law should physically observe treatment units and pump stations on a routine basis. Bypasses or overflows are required by 9 VAC 25-31-50 B to be reported within 24 hours of their occurrence.

x. **Thermal Mixing Zone (Special Condition I.B.21)**

Rationale: Past thermal mixing zone studies set the basis for thermal mixing zones and heat rejected limitations. The permit application for reissuance should state whether plant conditions used as a basis for thermal mixing zones have changed.

y. **OCPSF Flows (Special Condition I.B.22)**

Rationale: Current limits at outfalls 007 and 029 are based on long term average flow of

process wastewater. Measurement of non-OCPSP flows are needed so that accurate flow numbers can be used in permit developing. Flow measurements should be performed periodically over the life of the permit.

**z. Storm Water Management Evaluation (Special Condition I.B.23)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-10 defines discharges of storm water from industrial activity in 9 industrial categories. 9 VAC 25-31-120 requires a permit for these discharges. The Storm Water Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of storm water associated with industrial activity, 9 VAC 25-151-10 et seq. VPDES Permit Regulation, 9 VAC 25-31-220 K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limits or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

The effectiveness of the SWPPP will be evaluated via monitoring for those parameters listed in Part I.A of this permit for these outfalls and as described in the storm water management evaluation special condition. The goal is to reduce pollutant discharges in storm water to ensure the protection of water quality standards. Given the technical complexities associated with assessing wet weather water quality impacts, the permittee will rely on the implementation of the SWPPP to pursue the goal. In addition, the Department has developed decision for WQS parameters, to serve as a screening tool for storm water quality. Other decision criteria are similar to those used in 9 VAC 25-151-10 et seq., the Commonwealth's general permit for storm water discharges from areas of industrial activity and are applicable to this facility. The permittee shall use these comparative values along with storm water monitoring data, to guide its review of the SWPPP, revisions to the Plan and as an aid in developing appropriate storm water controls.

<u>Comparative Values:</u>	Total Suspended Solids	100	mg/l
	Oil and Grease	15	mg/l
	Nitrate/Nitrite	1.8	mg/l
	Dissolved Zinc	190	ug/l
	Dissolved Copper	22	ug/l

**aa. PCB Monitoring (Special Condition I.B.24)**

Rationale: provided by 9VAC 25-260-10, 9 VAC 25-260-140, and GM09-2001. 9VAC 25-260-10 and 9 VAC 25-260-140 are part of Virginia's Water Quality Standards. 9VAC 25-260-10 contains the "fishable" designated use. 9 VAC 25-260-140 contains the PCB water quality criterion. GM09-2001 provides the PCB monitoring protocol for TMDL development. A PCB TMDL for the New River is scheduled for completion in 2014. Outfalls 401, 006, 007, 024, 026, 029, and 041 (Drainage Area 6A) will be monitored since contributing wastewater meets the inclusion criteria in GM09-2001. GM09-2001 stipulates that the PCB data should not be used for compliance purposes.

**ab. Whole Effluent Toxicity Limitation (Special Conditions I.C)**

Rationale: Required by 9 VAC 25-31-220 D 1 d. See memo, included in **Attachment G** for specific rationale.

**ac. Toxics Monitoring Program (Special Conditions I.D.)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water

Control Law and the Clean Water Act. A TMP Justification Memo is included in **Attachment G**.

**ad. Storm Water Management and Pollution Prevention Plan (Part I.E and Part I.F)**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-10 defines discharges of storm water from industrial activity in 9 industrial categories. 9VAC25-31-120 requires a permit for these discharges. The Storm Water Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of storm water associated with industrial activity, 9VAC25-151-10 et seq. VPDES Permit Regulation, 9VAC25-31-220 K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

**ae. Part II, Conditions Applicable to All Permits**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

**20. NPDES Permit Rating Worksheet:**

Total Score 140; a copy is in the General Facility Information section of the **Attachment H**.

**21. Changes to Permit:**

Permit language has been updated to reflect the recommendations in the 1/27/10 VPDES Permit Manual.

- A. The monitoring frequency at Outfall 017 has been reduced from quarterly to annually. The permittee requested reduction in monitoring frequency due to very infrequent discharge.
- B. Outfall 006 has been added as an outfall eligible for the excursion time allowance in Part I.B.12. Similarly to Outfalls 005, 007, and 029, Outfall 006 has continuous pH monitoring.
- C. The sampling type at Outfall 024 is changed from 24hr composite sampling to grab sampling. Discharges from this outfall are typically of short duration with uncertain amounts of flow.
- D. Outfall 044 discharge sampling is moved from representative drainage area 5Z to drainage area 15C. Numerous efforts to sample the drainage area following heavy rain events have failed. Drainage area 15C should result in collectable, representative samples.
- E. Quantification levels (QLs) have been added to Part I.B.3 for all parameters.
- F. The compliance schedules for acute toxicity at Outfalls 006 & 007 in the previous Part I.B has been removed since the permittee has achieved compliance with the final effluent limitations.
- G. Interim EL pages have been removed from the permit.
- H. The general storm water management and the site specific storm water pollution prevention plan requirements have been updated to reflect the content in the 2009 General Permit for Storm Water Discharges Associated with Industrial Activities (VAR05).
- I. The annual stormwater management evaluation special condition (Part I.B.22) has been revised to include additional parameters whose stormwater monitoring results exceeded comparative values.
- J. Drainage areas 8A, 8B, and 8C have been reassigned to Zone F, with representative outfall now Outfall 012 instead of Outfall 041.
- K. PCB monitoring and pollutant minimization plan requirements have been added.

**22. Variances/Alternate Limits or Conditions:**

None.

**23. Regulation of Users:** There are no industrial users contributing to the municipal WWTP.

**24. Public Notice Information required by 9VAC25-31-280 B:**

All pertinent information is on file and may be inspected, and copied by contacting Kevin A. Harlow at: **Virginia DEQ Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019, Telephone No: (540) 562-6700; Email Address: Kevin.Harlow@deq.virginia.gov**

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Blue Ridge Regional Office by appointment.

**25. Additional Comments:**

Previous Board Action: None

Staff Comments: None

Public Comment: Public comment period ended with no comments.

**26. 303(d) Listed Segments (TMDL):** The facility discharges to segments VAW-N22R\_NEW03A00 and VAW-N22R\_NEW03A00 that are 303(d) segments listed for fish consumption advisory due to PCB in fish tissue. A TMDL for this impairment has not been developed. The facility is monitoring for PCBs at multiple outfalls to assist in the development of the TMDL.

TABLE III

INDUSTRIAL EFFLUENT LIMITATIONS

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

OUTFALL 402 – Non-Storm Water Flows

SIC CODES 2892, 4911

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	<u>Effluent Guidelines/ Judgement</u>	<u>Water Quality</u>	<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow, MG			NL	NA	NL	1/Month	Est
pH, SU		1	NA.	6.0	9.0	1/Month	Grab
Oxidized Nitrogen (mg/l)			NL	NA	NL	1/Month	Grab
Sulfate (mg/l)			NL	NA	NL	1/Month	Grab
Temperature (C)			NL	NA	NL	1/Month	Grab

Key

1. SWCB Water Quality Standards

TABLE III

INDUSTRIAL EFFLUENT LIMITATIONS

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

OUTFALL 004 - coal pile area

SIC CODES 2892, 4911

Parameter	BASIS FOR LIMITS		EFFLUENT LIMITS			MONITORING REQUIREMENTS	
	Effluent Guidelines/ Judgement	Water Quality	Monthly Average	Minimum	Maximum	Frequency	Sample Type
Flow, MG			NL	NA	NL	1/6M	Est**
pH, SU	I		NA	6.0	9.0	1/6M	Grab**
Nitrate/nitrite (mg/l)			NA	NA	NL	1/6M	Grab**
Sulfate (mg/l)			NA	NA	NL	1/6M	Grab**

Review of BMPs required if Nitrate/nitrite exceeds a comparative value of 176 mg/l.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

Key

1. SWCB Water Quality Standards

TABLE III

INDUSTRIAL EFFLUENT LIMITATIONS

(X) Final Limitations  
( ) Interim Limitations

OUTFALL 401 - coal pile

Dates: From eff date  
To exp date

SIC CODES 2892, 4911

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	<u>Effluent Guidelines/</u> <u>Judgement</u>	<u>Water</u> <u>Quality/</u>	<u>Monthly</u> <u>Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample</u> <u>Type</u>
Flow, MG			NL	NA	NL	1/6M	Est*
pH, SU		1	NA	6.0	9.0	1/6M	Grab**
Total suspended solids, mg/l	3		NA	NA	50	1/6M	Grab**

Key

1. SWCB Water Quality Standards
3. Best Engineering Judgement limits similar to 40 CFR 423 and 9 VAC 25-151-10 et seq

Any untreated overflow from facilities designed, constructed and operated to treat the volume of coal pile runoff that is associated with a 10-year, 24-hour rainfall event shall not be subject to the 50 mg/L limitation for total suspended solids.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 005  
cooling water, Oleum plant and storm water

Dates: From eff date  
To exp date

SIC CODES 2892,2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ 1	Water Quality	Monthly Average	Minimum	Maximum	Frequency	Sample Type
Flow, MGD			NL	NA	NL	Cont	Recorded
pH, SU	1		NA	6.0	9.0	Cont	Record
pH excursion time, total <sup>2</sup>			NA	NA	446 min	Cont	Recorded
pH excursion time, individual	2		NA	NA	60 min	Cont	Recorded
BOD(5) (mg/l)			NA	NA	NL	1/W	24HC
Chemical Oxygen Demand (mg/l)			NA	NA	NL	1/W	24HC
Temperature (C), intake	1		NA	NA	NL	Cont	Record
Temperature (C)	1		NA	NA	NL	Cont	Record
Heat rejected, BTU/day	1		NA	NA	$518 \times 10^6$	1/Day	Calculated
Oxidized nitrogen (mg/l)	1		NA	NA	NL	1/W	24HC
Total Suspended Solids (mg/l)	1		NA	NA	NL	1/M	24HC
Sulfate (mg/l) (kg/d)	7		2100 19000	NA	3000 21000	1/W	24HC

Key

1. SWCB Water Quality Standards
2. 40 CFR 401.17
7. BEJ limit, maximum solubility of calcium sulfate

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From effective date  
To exp date

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 006

cooling water, and storm water

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Regulations	Water Quality	Monthly Average	Minimum	Maximum	Frequency	Sample Type
Flow, MGD			NL	NA	NL	Cont	Recorded
pH, SU		1	NA	6.0	9.0	Cont	Record
BOD(5) (mg/l)	7		NA	NA	NL	1/M	24HC
Chemical Oxygen Demand (mg/l)			NA	NA	NL	1/M	24HC
Temperature (C)		1	NA	NA	NL	Cont	Record
Heat rejected, BTU/day		1	NA	NA	5208 X 10 <sup>6</sup>	1/Day	Calculated
Oxidized nitrogen (mg/l)		1	NA	NA	NL	1/M	24HC
Sulfate (mg/l)	7		NA	NA	NL	1/M	24HC
Acute Whole Effluent Toxicity		1	NA	NA	1.0 TUa	1/3 Months	24HC

Key

1. SWCB Water Quality Standards
7. Limit applied to outfall 999, sum of all discharges

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 007

Dates: From effective date  
To exp date

SIC CODES 2892, 2873

Parameter	BASIS FOR LIMITS		EFFLUENT LIMITS			MONITORING REQUIREMENTS	
	Effluent Guidelines/	Water Quality	Monthly Average	Minimum	Maximum	Frequency	Sample Type
Flow, MGD			NL	--	NL	Cont	Record
pH, SU		1	NA	6.0	9.0	Cont	Record
BOD(5) (mg/l) (kg/d)			24 164	NA	64 437	1/W	24HC
Total Suspended Solids (mg/l) (kg/d)			40 273	NA	80 888	1/W	24HC
Sulfate (mg/l) (kg/d)	10	1	2100 50000	NA	3000 59000	1/W	24HC
Temperature (C)		1	NA	NA	35	Cont	Record
Chemical Oxygen Demand (mg/l)			NA	NA	NL	1/W	24HC
Oxidized nitrogen (mg/l) (kg/d)		1	NL mg/l 6000 kg/d	NA	NL mg/l 10000 kg/d	1/W	24HC
Whole Effluent Toxicity, WET (TUa)		1	NA	NA	6.6	1/3M	24HC
Ammonia (mg/l)		1	NA	NA	NL	1/M	24HC
2,4-dinitrotoluene N-nitroso-diphenylamine			NA NA	NA NA	NL NL	1/M 1/Year	24HC 24HC
Total Chromium	11	NA	ug/l	10.76 kg/d	NA	NA ug/l	26.86 kg/d
Total Copper	11	NA	ug/l	14.06 kg/d	NA	NA ug/l	32.78 kg/d
Total Lead	11	NA	ug/l	3.10 kg/d	NA	NA ug/l	6.69 kg/d
Total Nickel	11	NA	ug/l	16.39 kg/d	NA	NA ug/l	38.60 kg/d
Total Zinc	11	NA	ug/l	10.18 kg/d	NA	NA ug/l	25.31 kg/d

(X) Final Limitations

OUTFALL 007 continued

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>						<u>MONITORING REQUIREMENTS</u>		
	Effluent Guidelines/	Water Quality	Monthly			<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>		
			<u>Average</u>								
Acenaphthene	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
Acenaphthylene	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
Acrylonitrile	1	NA ug/l	0.91	kg/d	NA	NA ug/l	1.72	kg/d	1/Year	Grab	
Anthracene	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
Benzene	11	NA ug/l	0.55	kg/d	NA	NA ug/l	1.30	kg/d	1/Year	Grab	
Benzo(a)anthracene	7	NA ug/l	NL	kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab	
3,4-Benzofluoranthene	11	NA ug/l	0.19	kg/d	NA	NA ug/l	0.47	kg/d	1/Year	Grab	
Benzo(k)fluoranthene	7	NA ug/l	NL	kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab	
Benzo(a)pyrene	7	NA ug/l	NL	kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab	
Bis(2-ethylhexyl)phthalate	11	NA ug/l	0.92	kg/d	NA	NA ug/l	2.50	kg/d	1/Year	Grab	
Carbon tetrachloride	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
Chlorobenzene	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
Chloroethane	11	NA ug/l	1.07	kg/d	NA	NA ug/l	2.86	kg/d	1/Year	Grab	
Chloroform	11	NA ug/l	1.08	kg/d	NA	NA ug/l	3.15	kg/d	1/Year	Grab	
Chrysene	7	NA ug/l	NL	kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab	
Di-n-butyl phthalate	11	NA ug/l	0.19	kg/d	NA	NA ug/l	0.42	kg/d	1/Year	Grab	
1,2-Dichlorobenzene	11	NA ug/l	1.90	kg/d	NA	NA ug/l	7.70	kg/d	1/Year	Grab	
1,3-Dichlorobenzene	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
1,4-Dichlorobenzene	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
1,1-Dichloroethane	11	NA ug/l	0.21	kg/d	NA	NA ug/l	0.57	kg/d	1/Year	Grab	
1,2-Dichloroethane	11	NA ug/l	1.75	kg/d	NA	NA ug/l	5.57	kg/d	1/Year	Grab	
1,1-Dichloroethylene	11	NA ug/l	0.21	kg/d	NA	NA ug/l	0.58	kg/d	1/Year	Grab	
1,2-trans-Dichloroethylene	11	NA ug/l	0.24	kg/d	NA	NA ug/l	0.64	kg/d	1/Year	Grab	
1,2-Dichloropropane	11	NA ug/l	1.90	kg/d	NA	NA ug/l	7.70	kg/d	1/Year	Grab	
1,3-Dichloropropylene	11	NA ug/l	1.90	kg/d	NA	NA ug/l	7.70	kg/d	1/Year	Grab	
Diethyl phthalate	11	NA ug/l	0.45	kg/d	NA	NA ug/l	1.10	kg/d	1/Year	Grab	
2,4-Dimethylphenol	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
Dimethyl phthalate	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
4,6-Dinitro-o-cresol	11	NA ug/l	0.76	kg/d	NA	NA ug/l	2.69	kg/d	1/Year	Grab	
2,4-Dinitrophenol	11	NA ug/l	11.71	kg/d	NA	NA ug/l	41.61	kg/d	1/Year	Grab	
Ethylbenzene	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
Fluoranthene	11	NA ug/l	0.21	kg/d	NA	NA ug/l	0.52	kg/d	1/Year	Grab	
Fluorene	11	NA ug/l	0.18	kg/d	NA	NA ug/l	0.46	kg/d	1/Year	Grab	
Hexachlorobenzene	7	NA ug/l	NL	kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab	
Hexachlorobutadiene	11	NA ug/l	1.38	kg/d	NA	NA ug/l	3.69	kg/d	1/Year	Grab	
Hexachloroethane	11	NA ug/l	1.90	kg/d	NA	NA ug/l	7.70	kg/d	1/Year	Grab	

(X) Final Limitations

OUTFALL 007 continued

<u>Parameter</u>	Effluent Guidelines/ Water Quality	<u>EFFLUENT LIMITS</u>						<u>MONITORING REQUIREMENTS</u>				
		Monthly		<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>				
Methyl Chloride	11	NA	ug/l	1.07	kg/d	NA	NA	ug/l	2.86	kg/d	1/Year	Grab
Methylene Chloride	11	NA	ug/l	0.35	kg/d	NA	NA	ug/l	1.65	kg/d	1/Year	Grab
Naphthalene	11	NA	ug/l	0.18	kg/d	NA	NA	ug/l	0.46	kg/d	1/Year	Grab
Nitrobenzene	1	NA	ug/l	21.69	kg/d	NA	NA	ug/l	45.18	kg/d	1/Year	Grab
2-Nitrophenol	11	NA	ug/l	0.63	kg/d	NA	NA	ug/l	2.24	kg/d	1/Year	Grab
4-Nitrophenol	11	NA	ug/l	1.57	kg/d	NA	NA	ug/l	5.59	kg/d	1/Year	Grab
Phenanthrene	11	NA	ug/l	0.18	kg/d	NA	NA	ug/l	0.46	kg/d	1/Year	Grab
Phenol	11	NA	ug/l	0.18	kg/d	NA	NA	ug/l	0.46	kg/d	1/Year	Grab
Pyrene	11	NA	ug/l	0.19	kg/d	NA	NA	ug/l	0.47	kg/d	1/Year	Grab
Tetrachloroethylene	11	NA	ug/l	0.50	kg/d	NA	NA	ug/l	1.59	kg/d	1/Year	Grab
Toluene	11	NA	ug/l	0.27	kg/d	NA	NA	ug/l	0.72	kg/d	1/Year	Grab
Total Cyanide	11	NA	ug/l	4.07	kg/d	NA	NA	ug/l	11.64	kg/d	1/Year	Grab
1,2,4-Trichlorobenzene	11	NA	ug/l	1.90	kg/d	NA	NA	ug/l	7.70	kg/d	1/Year	Grab
1,1,1-Trichloroethane	11	NA	ug/l	0.21	kg/d	NA	NA	ug/l	0.57	kg/d	1/Year	Grab
1,1,2-Trichloroethane	11	NA	ug/l	0.31	kg/d	NA	NA	ug/l	1.23	kg/d	1/Year	Grab
Trichloroethylene	11	NA	ug/l	0.25	kg/d	NA	NA	ug/l	0.67	kg/d	1/Year	Grab
Vinyl Chloride	7	NA	ug/l	NL	kg/d	NA	NA	ug/l	NL	kg/d	1/Year	Grab

Key

1. SWCB Water Quality Standards
7. Limit applied to outfall 999, sum of all discharges
10. BPJ limit
11. OCPSF Effluent Guidelines at 40 CFR 414, long term average flow = 2.562 MGD

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 012 - Storm water

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	<u>Effluent Guidelines/</u>	<u>Water Quality</u>	<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow, MGD			NL	--	NL	1/6 Months	Est **
pH, SU	1		NA	6.0	9.0	1/6 Months	Grab **
Sulfate (mg/l)			NA	NA	NL	1/6 Months	Grab **

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

Key:

1. SWCB Water Quality Standards

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 014  
Contaminated spring and storm water

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		Monthly Average	Minimum	Maximum	Frequency	Sample Type
Flow, MGD			NL	--	NL	1/M	Measure
pH, SU		1	NA	6.0	9.0	1/M	Grab
BOD(5) (mg/l)	6		NA	NA	NL	1/M	24HC
COD (mg/l)	6		NA	NA	NL	1/M	24HC
Oxidized Nitrogen (mg/l)			NA	NA	NL	1/M	24HC
Sulfate (mg/l)			NA	NA	NL	1/M	24HC

Key

1. SWCB Water Quality Standards
6. BMP required if BOD exceeds a target value 30 mg/l or if COD exceeds a target value of 120 mg/l, 40 CFR 414
12. TPH method used should be capable of detecting diesel range organics.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

STORM WATER MONITORING  
OUTFALL 017  
storm water from the opening burning ground

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	<u>Effluent Guidelines/</u>	<u>Water Quality</u>	<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow, MG			NL	NA	NL	1/YR	Est**
pH, SU	1		NA	NL	NL	1/YR	Grab**
Total Suspended Solids (mg/l)			NA	NA	NL	1/YR	Grab**
Copper (dissolved) (ug/l)	1		NA	NA	NL	1/YR	Grab**
Lead (dissolved) (ug/l)	1		NA	NA	NL	1/YR	Grab**
Zinc (dissolved) (ug/l)	1		NA	NA	NL	1/YR	Grab**

Key

I. SWCB Water Quality Standards

Review of BMPs required if dissolved lead exceeds a comparative value of 174 ug/l, or if dissolved copper exceeds a comparative value of 22 ug/l, or if dissolved zinc exceeds a comparative value of 190 ug/l or if TSS exceeds a comparative value of 100 mg/l.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first hour of the discharge. See storm water monitoring requirements.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 024  
Water Plant

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		Monthly <u>Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	Sample <u>Type</u>
Flow, MGD			NL	--	NL	1/M	Measure
pH, SU	1		NA	6.0	9.0	1/M	Grab
Total Suspended Solids (mg/l)	1		30	NA	60	1/M	Grab
Oxidized Nitrogen (mg/l)	1		NA	NA	NL	1/M	Grab
Biochemical Oxygen Demand (mg/l)	1		NA	NA	NL	1/M	Grab
Chemical Oxygen Demand (mg/l)			NA	NA	NL	1/M	Grab
Sulfate (mg/l)			NA	NA	NL	1/M	Grab
Ammonia (mg/l)	1		3.14	NA	3.14	1/M	Grab

\*Key

1. SWCB Water Quality Standards

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 026  
Trickling Filter STP

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality	Water Quality	Monthly <u>Average</u>	<u>Minimum</u>	<u>Maximum (*)</u>	Sample <u>Frequency</u>	Type
Flow, MGD			NL	--	NL	Cont	Record
pH, SU	1	NA	6.0	9.0		1/Day	Grab
pH, influent, SU	4		NL	NL		Cont	Recorded
BOD(5) (mg/l) (kg/d)	2	30 114	NA	45 170		3D/W	8HC
Total Suspended Solids (mg/l) (kg/d)	2	30 114	NA	45 170		3D/W	8HC
Ammonia (mg/l)	1	10.6	NA	13.4		1/W	24HC
Oxidized Nitrogen (mg/l)	1	NA	NA	NL		1/M	8HC
Sulfate (mg/l)	1	NA	NA	NL		1/M	8HC
Total Residual Chlorine, TRC contact (mg/l)	1	NA	1.5	NA		3/D	Grab
Chemical Oxygen Demand (mg/l)		NA	NA	NL		1/M	8HC
Total Residual Chlorine, TRC final (mg/l)	1	0.087	NA	0.10		1/D	Grab

Key

1. SWCB Water Quality Standards
2. Secondary Treatment Regulation, 40 CFR 133
- \* since the facility is not a POTW, BOD, TSS, Ammonia and TRC, final maximum limits are daily maxima
4. To protect biomass from infiltration of acid wastewater

NOTE: The permittee may use a 24 hour composite sample as a substitute for an 8 hour composite sample.

The design flow of this facility is 1.0 MGD

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 028  
Imhoff STP

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>		
	Effluent Guidelines/	Water Quality	Monthly	Average	Minimum	Maximum (*)	Sample Frequency	Type
Flow, MGD			NL	--	NL		Cont	Record
pH, SU		4	NA	6.0	9.0		1/Day	Grab
BOD(5) (mg/l) (kg/d)		2	30 7.9	NA	45 11.9		1/M	4HC
Total Suspended Solids (mg/l) (kg/d)		2	30 7.9	NA	45 11.9		1/M	4HC
Oxidized Nitrogen (mg/l)		1	NA	NA	NA	NL	1/M	4HC
Sulfate (mg/l)		1	NA	NA	NA	NL	1/M	4HC
COD (mg/l)			NA	NA	NA	NL	1/M	4HC
Total Residual Chlorine, TRC contact (mg/l)		1	NA	1.5	NA		3/D	Grab
Total Residual Chlorine, TRC final (mg/l)		1	0.10	NA	0.10		1/D	Grab

\*Key

1. SWCB Water Quality Standards
2. Secondary Treatment Regulation, 40 CFR 133

\* since the facility is not a POTW, BOD, TSS and TRC, final maximum limits are daily maxima

NOTE: The permittee may use a 24 hour composite sample as a substitute for a 4 hour composite sample.

The design flow of this facility is 0.07 MGD

TABLE III

(X) Final Limitations  
( ) Interim Limitations

**INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 029  
Biological Treatment Plant (bioplant)**

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

BASIS FOR LIMITS		EFFLUENT LIMITS			MONITORING REQUIREMENTS	
Parameter	Effluent Guidelines/ Water Quality	Monthly			Sample Frequency	Type
		Average	Minimum	Maximum (*)		
Flow, MGD		NL	--	NL	Cont	Recorded
pH, SU	1		6.0	9.0	Cont	Recorded
BOD(5) (mg/l) (kg/d)	11	60 91	NA	120 243	I/W	24HC
Total Suspended Solids (mg/l) (kg/d)	11	NL 149	NA	NL 484	I/W	24HC
Chemical Oxygen Demand (mg/l) (kg/d)	10,11	200 318	NA NA	290 850	I/W	24HC
Temperature (C)	1	NA	NA	NL	Cont	Record
Heat Rejected, million BTU/day	1	NA	NA	291	I/Day	Calculated
Oxidized Nitrogen (mg/l & kg/d)	1	NA	NA	NL	I/W	24HC
Sulfate (mg/l) (kg/d)	1	NL 3000	NA	NL 6000	I/M	24HC
Whole Effluent Toxicity, WET (TUa)	1	NA	NA	1	1/3M	24HC
N-nitroso-diphenylamine	5	NA	NA	NL	1/Yr	24HC
BOD, influent (mg/l)		NL	NA	NL	I/M	24HC
COD, influent (mg/l)		NL	NA	NL	I/M	24HC
TSS, influent (mg/l)		NL	NA	NL	I/M	24HC

(X) Final Limitations

OUTFALL 029 continued

<u>Parameter</u>	Effluent Guidelines/Water Quality	<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>			
		<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum (*)</u>	<u>Frequency</u>	<u>Sample Type</u>		
Acenaphthene	11	22 ug/l	0.080 kg/d	NA	NA ug/l	0.21 kg/d	1/Year	Grab
Acrylonitrile	11	96 ug/l	0.35 kg/d	NA	NA ug/l	0.88 kg/d	1/Year	Grab
Benzene	11	37 ug/l	0.13 kg/d	NA	NA ug/l	0.49 kg/d	1/Year	Grab
Carbon tetrachloride	11	18 ug/l	0.066 kg/d	NA	NA ug/l	0.13 kg/d	1/Year	Grab
Chlorobenzene	11	NA ug/l	0.055 kg/d	NA	NA ug/l	0.10 kg/d	1/Year	Grab
1,2,4-Trichlorobenzene	11	NA ug/l	0.24 kg/d	NA	NA ug/l	0.51 kg/d	1/Year	Grab
Hexachlorobenzene	7	NA ug/l	NL kg/d	NA	NA ug/l	NL kg/d	1/Year	Grab
1,2-Dichloroethane	11	NA ug/l	0.24 kg/d	NA	NA ug/l	0.77 kg/d	1/Year	Grab
1,1,1-Trichloroethane	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.19 kg/d	1/Year	Grab
Hexachloroethane	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.19 kg/d	1/Year	Grab
1,1-Dichloroethane	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21 kg/d	1/Year	Grab
1,1,2-Trichloroethane	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.19 kg/d	1/Year	Grab
Chloroethane	11	NA ug/l	0.38 kg/d	NA	NA ug/l	0.98 kg/d	1/Year	Grab
Chloroform	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.16 kg/d	1/Year	Grab
2-Chlorophenol	11	NA ug/l	0.11 kg/d	NA	NA ug/l	0.35 kg/d	1/Year	Grab
1,2-Dichlorobenzene	11	NA ug/l	0.28 kg/d	NA	NA ug/l	0.59 kg/d	1/Year	Grab
1,3-Dichlorobenzene	11	NA ug/l	0.11 kg/d	NA	NA ug/l	0.16 kg/d	1/Year	Grab
1,4-Dichlorobenzene	11	NA ug/l	0.055 kg/d	NA	NA ug/l	0.10 kg/d	1/Year	Grab
1,1-Dichloroethylene	11	NA ug/l	0.059 kg/d	NA	NA ug/l	0.09 kg/d	1/Year	Grab
1,2-trans-Dichloroethylene	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.19 kg/d	1/Year	Grab
2,4-Dichlorophenol	11	NA ug/l	0.14 kg/d	NA	NA ug/l	0.41 kg/d	1/Year	Grab
1,2-Dichloropropane	11	NA ug/l	0.55 kg/d	NA	NA ug/l	0.84 kg/d	1/Year	Grab
1,3-Dichloropropylene	11	NA ug/l	0.10 kg/d	NA	NA ug/l	0.16 kg/d	1/Year	Grab
2,4-Dimethylphenol	11	NA ug/l	0.06 kg/d	NA	NA ug/l	0.13 kg/d	1/Year	Grab
2,4-Dinitrotoluene	11	NA ug/l	0.41 kg/d	NA	NA ug/l	1.04 kg/d	1/Week	Grab

(X) Final Limitations

OUTFALL 029 continued

<u>Parameter</u>	BASIS FOR LIMITS Effluent Guidelines/Water Quality	EFFLUENT LIMITS			MONITORING REQUIREMENTS				
		Monthly Average	Minimum	Maximum (*)	Frequency	Sample Type			
2,6-Dinitrotoluene	11	NA ug/l	0.93 kg/d	NA	NA ug/l	2.34	kg/d	1/Year	Grab
Ethylbenzene	11	NA ug/l	0.11 kg/d	NA	NA ug/l	0.39	kg/d	1/Year	Grab
Fluoranthene	11	NA ug/l	0.091 kg/d	NA	NA ug/l	0.24	kg/d	1/Year	Grab
Methylene Chloride	11	NA ug/l	0.14 kg/d	NA	NA ug/l	0.32	kg/d	1/Year	Grab
Methyl Chloride	11	NA ug/l	0.31 kg/d	NA	NA ug/l	0.69	kg/d	1/Year	Grab
Hexachlorobutadiene	11	NA ug/l	0.073 kg/d	NA	NA ug/l	0.17	kg/d	1/Year	Grab
Naphthalene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21	kg/d	1/Year	Grab
Nitrobenzene	11	NA ug/l	0.099 kg/d	NA	NA ug/l	0.24	kg/d	1/Year	Grab
2-Nitrophenol	11	NA ug/l	0.15 kg/d	NA	NA ug/l	0.25	kg/d	1/Year	Grab
4-Nitrophenol	11	NA ug/l	0.26 kg/d	NA	NA ug/l	0.45	kg/d	1/Year	Grab
2,4-Dinitrophenol	11	NA ug/l	0.26 kg/d	NA	NA ug/l	0.45	kg/d	1/Year	Grab
4,6-Dinitro-o-cresol	11	NA ug/l	0.28 kg/d	NA	NA ug/l	1.01	kg/d	1/Year	Grab
Phenol	11	NA ug/l	0.055 kg/d	NA	NA ug/l	0.09	kg/d	1/Year	Grab
Bis(2-ethylhexyl)phthalate	11	NA ug/l	0.37 kg/d	NA	NA ug/l	1.02	kg/d	1/Year	Grab
Di-n-butyl phthalate	11	NA ug/l	0.099 kg/d	NA	NA ug/l	0.20	kg/d	1/3 Months	Grab
Diethyl phthalate	11	NA ug/l	0.29 kg/d	NA	NA ug/l	0.74	kg/d	1/Year	Grab
Dimethyl phthalate	11	NA ug/l	0.069 kg/d	NA	NA ug/l	0.17	kg/d	1/Year	Grab
Benzo(a)anthracene	7	NA ug/l	NL kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab
Benzo(a)pyrene	7	NA ug/l	NL kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab
3,4-Benzofluoranthene	11	NA ug/l	0.084 kg/d	NA	NA ug/l	0.22	kg/d	1/Year	Grab
Benzo(k)fluoranthene	7	NA ug/l	NL kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab
Chrysene	7	NA ug/l	NL kg/d	NA	NA ug/l	NL	kg/d	1/Year	Grab
Acenaphthylene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21	kg/d	1/Year	Grab
Anthracene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21	kg/d	1/Year	Grab
Fluorene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21	kg/d	1/Year	Grab

(X) Final Limitations

OUTFALL 029 continued

<u>Parameter</u>	Effluent Guidelines/Water Quality	<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>			
		<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum (*)</u>		<u>Frequency</u>	<u>Sample Type</u>	
Phenanthrene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.21 kg/d	1/Year	Grab
Pyrene	11	NA ug/l	0.091 kg/d	NA	NA ug/l	0.24 kg/d	1/Year	Grab
Tetrachloroethylene	11	NA ug/l	0.080 kg/d	NA	NA ug/l	0.20 kg/d	1/Year	Grab
Toluene	11	NA ug/l	0.095 kg/d	NA	NA ug/l	0.29 kg/d	1/Year	Grab
Trichloroethylene	11	NA ug/l	0.077 kg/d	NA	NA ug/l	0.19 kg/d	1/Year	Grab
Vinyl Chloride	11	NA ug/l	0.38 kg/d	NA	NA ug/l	0.98 kg/d	1/Year	Grab
Total Chromium	11	NA ug/l	4.05 kg/d	NA	NA ug/l	10.12 kg/d	1/3 Months	24 HC
Total Copper	11	NA ug/l	5.30 kg/d	NA	NA ug/l	12.35 kg/d	1/3 Months	24 HC
Total Cyanide	11	NA ug/l	1.53 kg/d	NA	NA ug/l	4.38 kg/d	1/Year	Grab
Total Lead	11	NA ug/l	1.17 kg/d	NA	NA ug/l	2.52 kg/d	1/3 Months	24 HC
Total Nickel	11	NA ug/l	6.17 kg/d	NA	NA ug/l	14.5 kg/d	1/3 Months	24 HC
Total Zinc	11	NA ug/l	3.83 kg/d	NA	NA ug/l	9.54 kg/d	1/3 Months	24 HC

Key:

1. SWCB Water Quality Standards
5. BPJ from EPA Gold Book
7. Limit applied to outfall 999, sum of all discharges
10. BPJ
11. From 40 CFR 414, outfall 029 long term average process flow = 0.966 MGD

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 291  
Internal outfall from TNT/DNT area(when active)

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		Monthly <u>Average</u>	<u>Minimum</u>	<u>Maximum</u>	Sample <u>Frequency</u>	<u>Type</u>
Flow, MGD			NL	NA	NL	1/D-Week	measure
TNT Nitro bodies (kg/d)	13		0.9	NA	1.3	1/D-Week	grab

\*Key

13 Best professional judgement based on removal efficiency of activated carbon.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

INDUSTRIAL EFFLUENT LIMITATIONS  
OUTFALL 999  
Summary of all continuous outfalls

Dates: From eff date  
To exp date

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/	Water Quality	Monthly Average	Minimum	Maximum (*)	Sample Frequency	Type
BOD(5) (kg/d)		3	6,700	NA	10,000	1/Month	Calculated
Total Suspended Solids TSS (kg/d)		10	6,200	NA	9,300	1/Month	Calculated
Chemical Oxygen Demand COD (kg/d)		10	14,500	NA	22,000	1/Month	Calculated
Oxidized nitrogen (kg/d)		1	6,600	NA	10,000	1/Month	Calculated
Sulfates (kg/d)		1	50,000	NA	75,000	1/Month	Calculated
Vinyl Chloride (kg/day)		1	0.90	NA	1.36	1/Year	Calculated
Chrysene (kg/day)		1	0.18	NA	0.26	1/Year	Calculated
Benzo(a)anthracene (kg/day)		1	0.18	NA	0.26	1/Year	Calculated
Benzo(a)pyrene (kg/day)		1	0.18	NA	0.26	1/Year	Calculated
Benzo(k)fluoranthene (kg/day)		1	0.18	NA	0.26	1/Year	Calculated
Hexachlorobenzene (kg/day)		1	0.03	NA	0.04	1/Year	Calculated

\*Key

1. SWCB Water Quality Standards
3. SWCB Water Quality Management Plan
10. BPJ

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

STORM WATER MONITORING  
OUTFALL 041  
storm water from zone G

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		Monthly <u>Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	Sample Type
Flow, MG			NA	NA	NL	1/3M	Est**
Oil and Grease (mg/l)			NA	NA	NL	1/3M	Grab**
Total Suspended Solids (mg/l)			NA	NA	NL	1/3M	Grab**

Review of BMPs required if O&G exceeds a comparative value 15 mg/l, or if TSS exceeds a comparative value of 100 mg/l.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

STORM WATER MONITORING  
OUTFALL 044  
storm water from zone E

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>		
	Effluent Guidelines/	Water Quality	Monthly	Average	Minimum	Maximum	Frequency	Sample Type
Flow, MG			NA	NA	NL		1/6M	Est**
Oil and Grease (mg/l)			NA	NA	NL		1/6M	Grab**
Total Suspended Solids (mg/l)			NA	NA	NL		1/6M	Grab**

Review of BMPs required if O&G exceeds a comparative value 15 mg/l, or if TSS exceeds a comparative value of 100 mg/l.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

STORM WATER MONITORING  
OUTFALL 050  
storm water from zone D

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow, MG			NA	NA	NL	1/6M	Est**
Oil and Grease (mg/l)			NA	NA	NL	1/6M	Grab**
Total Suspended Solids (mg/l)			NA	NA	NL	1/6M	Grab**
Nitrate plus nitrite (mg/l)			NA	NA	NL	1/6M	Grab**
Dissolved lead (ug/l)			NA	NA	NL	1/6M	Grab**
Dissolved zinc (ug/l)			NA	NA	NL	1/6M	Grab**

Monitoring shall be rotated between outfalls 11A and 12A so that each is sampled once per year, if possible.

Review of BMPs required if O&G exceeds a comparative value 15 mg/l, or if TSS exceeds a comparative value of 100 mg/l, or if nitrate/nitrite exceeds a comparative value of 1.76 mg/l, or if dissolved lead exceeds a comparative value of 174 ug/L, or if dissolved zinc exceeds a comparative value of 190 ug/l.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

TABLE III

(X) Final Limitations  
( ) Interim Limitations

Dates: From eff date  
To exp date

STORM WATER MONITORING  
OUTFALL 054  
storm water from zone C

SIC CODES 2892, 2873

<u>Parameter</u>	<u>BASIS FOR LIMITS</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS</u>	
	Effluent Guidelines/ Water Quality		<u>Monthly Average</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow, MG			NA	NA	NL	1/Year	Est**
Total Suspended Solids (mg/l)			NA	NA	NL	1/Year	Grab**
Dissolved Zinc (ug/l)			NA	NA	NL	1/Year	Grab**

Review of BMPs required if dissolved zinc exceeds a comparative value of 190 ug/l, or if TSS exceeds a comparative value of 100 mg/L.

\*\* Estimate of the total volume of the discharge during the storm event should be reported as flow. The grab sample shall be taken within the first 30 minutes of the discharge. See storm water monitoring requirements.

Revised 2/2003

**State "FY2003 Transmittal Checklist" to Assist in Targeting  
Municipal and Industrial Individual NPDES Draft Permits for Review**

**Part I. State Draft Permit Submission Checklist**

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Radford Army Ammunition Plant  
NPDES Permit Number: VA0000248  
Permit Writer Name: Kevin A. Harlow  
Date: April 9, 2010

**Major [X]**      **Minor [ ]**      **Industrial [ ]**      **Municipal [X]**

I.A. Draft Permit Package Submittal Includes:	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?		X	
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilities?	X		

I.B. Permit/Facility Characteristics	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics – cont. (FY2003)	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?	X		
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?		X	
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?	X		
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?		X	
9. Have any limits been removed, or are any limits less stringent, than those in the current permit? fecal coliform limit replaced with E. coli limit (more stringent)		X	
10. Does the permit authorize discharges of storm water?	X		
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?	X		
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?	X		
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

## Part II. NPDES Draft Permit Checklist (FY2003)

### Region III NPDES Permit Quality Checklist – for POTWs (To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		
II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X
II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X
II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X

II.D. Water Quality-Based Effluent Limits – cont. (FY2003)	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			X
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?	X		

**II.F. Special Conditions – cont. (FY2003)**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?	X		
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			X
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

**II.G. Standard Conditions**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

**List of Standard Conditions – 40 CFR 122.41**

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
Duty to mitigate	Monitoring and records	Transfers
Proper O & M	Signatory requirement	Monitoring reports
Permit actions	Bypass	Compliance schedules
	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?

X		
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## Part II. NPDES Draft Permit Checklist (FY2003)

### Region III NPDES Permit Quality Review Checklist – For Non-Municipals *(To be completed and included in the record for all non-POTWs)*

II.A. Permit Cover Page/Administration		
	Yes	No
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X	
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X	

II.B. Effluent Limits – General Elements		
	Yes	No
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X	
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?		X

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)		
	Yes	No
1. Is the facility subject to a national effluent limitations guideline (ELG)?	X	
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?	X	
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?		X
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?	X	
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?	X	
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?	X	
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?		X
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?		X
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?	X	

**II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ) – cont.**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?	X		
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?		X	

**II.D. Water Quality-Based Effluent Limits**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?		X	
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

FY2003

II.E. Monitoring and Reporting Requirements (FY2003)	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?	X		
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?	X		
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

#### List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
Duty to mitigate	Monitoring and records	Transfers
Proper O & M	Signatory requirement	Monitoring reports
Permit actions	Bypass	Compliance schedules
	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?	X		
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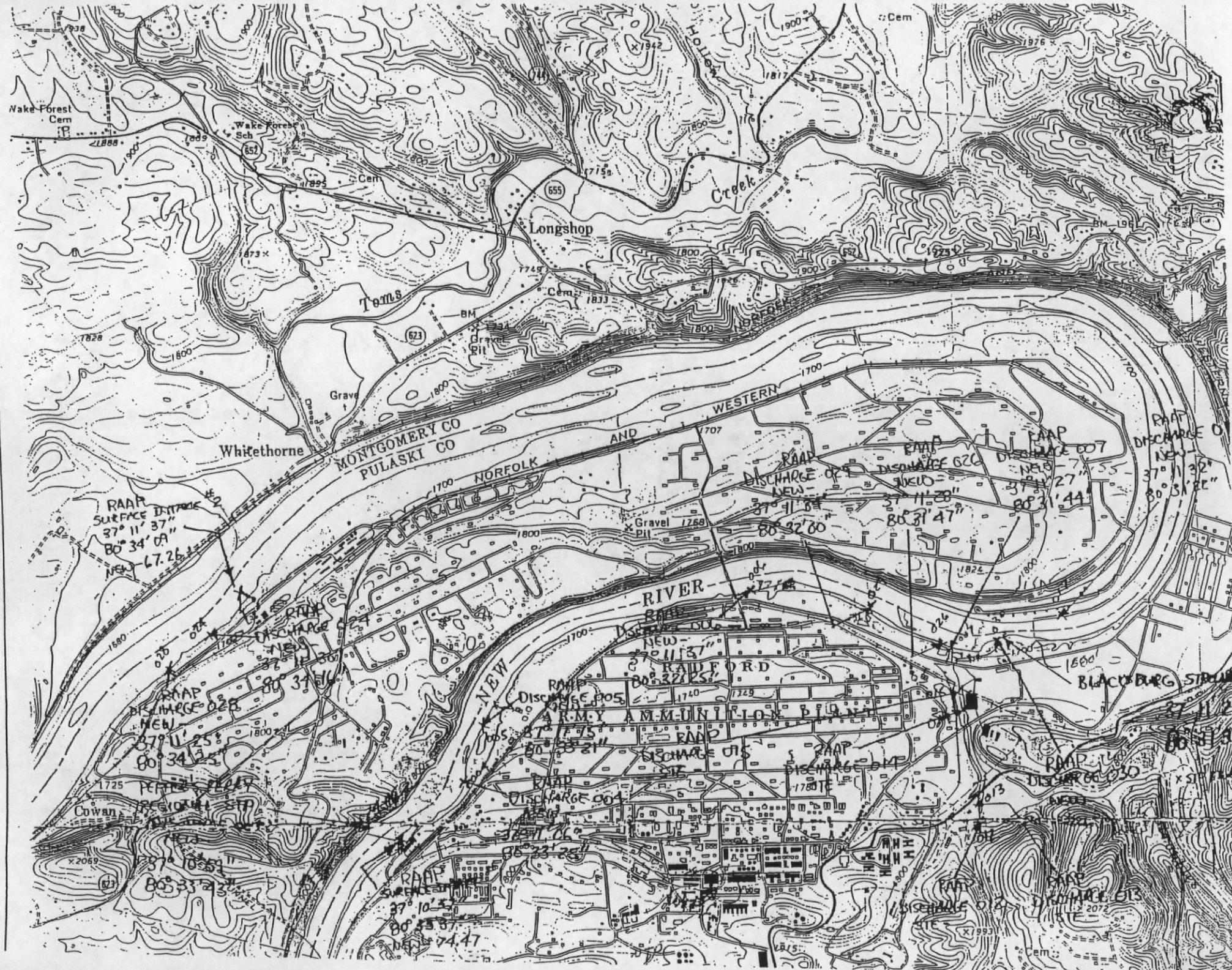
### **Part III. Signature Page (FY2003)**

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Kevin A. Harlow</u>
Title	<u>Water Permit Writer</u>
Signature	<u>Kevin A. Harlow</u>
Date	<u>4/9/2010</u>

## **Attachments**

- A. USGS Topographic Map**
- B. Flow Frequency Memorandum**
- C. Site Visit Report**
- D. Ambient Water Quality Information**
  - **2008 305b Watershed Summary Report**
  - **STORET Data (Station 9-NEW081.72)**
- E. Wasteload and Limit Calculations**
  - **Mixing Zone Calculations**
  - **Wasteload Allocation Spreadsheet**
  - **STATS Program Results**
  - **DO Model Results**
- F. Historical Limit Development**
- G. TMP Justification Memorandum**
- H. NPDES Permit Rating Worksheet**



**Attachment B**

**Flow Frequency Memorandum**

## MEMORANDUM

**DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION**  
**West Central Regional Office**  
**3019 Peters Creek Road Roanoke, Virginia 24019**

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**SUBJECT:** Flow Frequency Determination  
Radford Army Ammunition Plant - VA0000248

**FROM:** Kevin Harlow, WCRO

**DATE:** February 22, 2010

This memo is an update of the previous flow frequency determination memo from dated January 16, 2005 concerning the subject VPDES permit. The Radford Army Ammunition Plant (RAAP) discharges via several outfalls on the New River and two outfalls on the Stroubles Creek. All of these outfalls are located near Radford, VA. Stream flow frequencies are required for several outfalls for use by the permit writer in developing effluent limitations for the VPDES permit.

The USGS has operated a continuous record gage on the New River at Radford, VA (#0317100) since 1940. The gage is approximately 6.0 miles upstream of the RAAP intake #1. The flow frequencies for the gage and discharge point are presented below. The values at the discharge points were calculated using drainage area proportions and account for the known withdrawals located between the gage and the outfalls. This analysis does not address any other withdrawals, discharges, or springs which may influence the flow in the New River between the gage and the downstream-most outfall (028) for RAAP.

**New River at Radford, VA (#0317100):**

$$\text{Drainage Area} = 2,748 \text{ mi}^2$$

1Q10 = 465 MGD	High Flow 1Q10 = 543 MGD
7Q10 = 573 MGD	High Flow 7Q10 = 782 MGD
30Q5 = 737 MGD	HM = 1519 MGD
30Q10 = 659 MGD	High Flow 30Q10 = 1073 MGD
ANN AVG = 2453 MGD	

The high flow months are January through May.

Using drainage area proportions, the river flows were projected to just above outfall 004. The withdrawals by the Radford Army Ammunition Plant (RAAP) intake #1 (Bldg. 408) and the Blacksburg, Christiansburg, VPI Water Authority (BCVPIWA) and the discharges from the Peppers Ferry STP and Christiansburg STP were incorporated into the analysis. The minimum discharged by the Peppers Ferry STP was 2.80 MGD. The withdrawal data for RAAP and the BCVPIWA were taken from the Virginia Water Use Data System for the period 2004-2009. The maximum withdrawal for RAAP #1 was 17.65 MGD while the BCVPIWA maximum withdrawal was 10.2 MGD.

### **New River above RAAP Outfall 004**

Drainage Area = 2,791.27 mi<sup>2</sup>

1Q10 = 449 MGD	High Flow 1Q10 = 528 MGD
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD
30Q5 = 725 MGD	HM = 1520 MGD
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD
ANN AVG = 2468 MGD	

Projecting 004 flows to 005,

### **New River above RAAP Outfall 005:**

Drainage Area = 2,791.541 mi<sup>2</sup>

1Q10 = 449 MGD	High Flow 1Q10 = 528 MGD
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD
30Q5 = 725 MGD	HM = 1520 MGD
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD
ANN AVG = 2469 MGD	

Projecting 005 flows to 006,

### **New River above RAAP Outfall 006:**

Drainage Area = 2,791.541 mi<sup>2</sup>

1Q10 = 449 MGD	High Flow 1Q10 = 528 MGD
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD
30Q5 = 726 MGD	HM = 1520 MGD
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD
ANN AVG = 2469 MGD	

Projecting 006 flows to 029,

### **New River above RAAP Outfall 029:**

Drainage Area = 2,792.557 mi<sup>2</sup>

1Q10 = 449 MGD	High Flow 1Q10 = 529 MGD
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD
30Q5 = 726 MGD	HM = 1520 MGD
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD
ANN AVG = 2469 MGD	

Projecting 029 flows to 026,

**New River above RAAP Outfall 026:**

Drainage Area = 2,792.712 mi <sup>2</sup>			
1Q10 = 449 MGD	High Flow 1Q10 = 529 MGD		
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD		
30Q5 = 726 MGD	HM = 1520 MGD		
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD		
ANN AVG = 2470 MGD			

Projecting 026 flows to 007,

**New River above RAAP Outfall 007:**

Drainage Area = 2,792.726 mi <sup>2</sup>			
1Q10 = 449 MGD	High Flow 1Q10 = 529 MGD		
7Q10 = 559 MGD	High Flow 7Q10 = 771 MGD		
30Q5 = 726 MGD	HM = 1520 MGD		
30Q10 = 646 MGD	High Flow 30Q10 = 1067 MGD		
ANN AVG = 2470 MGD			

Downstream of Outfall 007, Stroubles Creek enters the New River. RAAP operates two outfalls on the Stroubles Creek which require flow frequencies. The flows in Stroubles Creek were determined using the USGS continuous record gage on the Walker Creek at Bane, VA (#03173000) and drainage area proportions. This analysis does not address any withdrawals, discharges, or springs which may influence the flows in Stroubles Creek upstream of the discharge points.

**Walker Creek at Bane, VA (#03173000):**

Drainage Area = 305 mi <sup>2</sup>			
1Q10 = 19 MGD	High Flow 1Q10 = 29 MGD		
7Q10 = 21 MGD	High Flow 7Q10 = 37 MGD		
30Q5 = 26 MGD	HM = 72 MGD		
30Q10 = 24 MGD	High Flow 30Q10 = 56 MGD		
ANN AVG = 207 MGD			

**Stroubles Creek at Outfall 012:**

Drainage Area = 23.47 mi <sup>2</sup>			
1Q10 = 1.5 MGD	High Flow 1Q10 = 2.2 MGD		
7Q10 = 1.6 MGD	High Flow 7Q10 = 2.8 MGD		
30Q5 = 2.0 MGD	HM = 5.5 MGD		
30Q10 = 1.8 MGD	High Flow 30Q10 = 4.3 MGD		
ANN AVG = 16 MGD			

Projecting 012 flows to 014,

**Stroubles Creek at Outfall 014:**

Drainage Area = 24.19 mi <sup>2</sup>	
1Q10 = 1.5 MGD	High Flow 1Q10 = 2.3 MGD
7Q10 = 1.7 MGD	High Flow 7Q10 = 2.9 MGD
30Q5 = 2.1 MGD	HM = 5.7 MGD
30Q10 = 1.9 MGD	High Flow 30Q10 = 4.4 MGD
ANN AVG = 16 MGD	

Adding the Stroubles Creek flow and drainage area to 007:

**New River below Stroubles Creek:**

Drainage Area = 2816.966 mi <sup>2</sup>	
1Q10 = 451 MGD	High Flow 1Q10 = 531 MGD
7Q10 = 561 MGD	High Flow 7Q10 = 774 MGD
30Q5 = 728 MGD	HM = 1526 MGD
30Q10 = 648 MGD	High Flow 30Q10 = 1072 MGD
ANN AVG = 2486 MGD	

Using drainage area proportions, the flows were projected to a point just above outfall 024. The RAAP #2 intake is located just upstream of 024. The maximum withdrawal during the last five years was MGD during August 1983 while the maximum high flow period withdrawal was 1.62 MGD. Lower Stroubles WWTP discharges into the New River between the New River below Stroubles Creek and Outfall 024. The minimum discharge from Lower Stroubles since 2007 was 3.92 MGD.

**New River above RAAP Outfall 024:**

Drainage Area = 2,862.931 mi <sup>2</sup>	
1Q10 = 463 MGD	High Flow 1Q10 = 545 MGD
7Q10 = 576 MGD	High Flow 7Q10 = 794 MGD
30Q5 = 747 MGD	HM = 1562 MGD
30Q10 = 666 MGD	High Flow 30Q10 = 1097 MGD
ANN AVG = 2535 MGD	

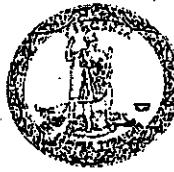
Projecting 024 flows to 028,

**New River above RAAP Outfall 028:**

Drainage Area = 2,862.946 mi <sup>2</sup>	
1Q10 = 463 MGD	High Flow 1Q10 = 545 MGD
7Q10 = 576 MGD	High Flow 7Q10 = 794 MGD
30Q5 = 747 MGD	HM = 1562 MGD
30Q10 = 666 MGD	High Flow 30Q10 = 1097 MGD
ANN AVG = 2535 MGD	

## WITHDRAWAL DATA

System	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann	Ann/365	MaxDay
BCVPI-WTP	2004	196.4	208.7	208.6	214.6	211.2	193.1	205.3	216.8	224.7	215.4	200.9	196.3	2492	6.83	8.70
BCVPI-WTP	2005	195.8	195.7	201.3	212.4	206.4	208.6	206.7	216.4	235.7	231.1	202.0	209.9	2522	6.91	10.20
BCVPI-WTP	2006	210.3	207.4	216.1	218.2	215.1	210.6	204.3	227.1	215.3	212.5	199.2	189.2	2525	6.92	Unk
BCVPI-WTP	2007	199.0	197.6	204.7	197.1	202.1	198.9	209.0	240.6	239.3	236.6	193.4	193.7	4812	13.18	9.50
BCVPI-WTP	2008	208.0	203.4	209.6	209.1	197.0	203.3	203.2	228.6	218.7	218.1	207.7	197.6	2504	6.86	9.50
BCVPI-WTP	2009	194.0	191.7	201.2	203.3	202.5	194.1	198.8	189.4	219.3	212.0	193.2	190.3	2390	6.55	8.70
RAAP WTP 1	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.00	0.00
RAAP WTP 1	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.00	0.00
RAAP WTP 1	2007	464.4	442.6	497.5	464.7	484.8	492.6	470.7	394.8	491.8	495.4	487.1	447.4	5634	15.44	16.05
RAAP WTP 1	2006	508.0	390.8	467.6	445.5	473.7	464.5	473.8	488.4	502.9	487.8	474.0	491.3	5668	15.53	17.65
RAAP WTP 1	2004	463.0	440.0	445.0	427.0	420.0	419.0	369.0	444.0	432.0	437.0	414.0	423.0	5133	14.06	16.00
RAAP WTP 1	2005	773.2	699.5	754.1	809.8	845.8	880.4	849.2	840.2	733.8	805.6	763.1	766.5	9521	26.09	30.00
RAAP WTP 2	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.00	0.00
RAAP WTP 2	2007	37.3	36.2	38.5	35.8	36.0	32.5	35.8	37.5	35.9	38.1	36.9	45.1	446	1.22	1.45
RAAP WTP 2	2006	36.1	29.6	33.4	31.3	31.9	32.9	35.0	37.7	37.5	44.0	44.8	40.6	435	1.19	1.62
RAAP WTP 2	2005	29.7	26.4	28.8	27.3	28.6	29.7	30.9	31.7	31.1	32.4	34.1	38.5	369	1.01	1.36
RAAP WTP 2	2004	37.0	27.0	28.0	27.0	28.0	27.0	27.0	30.0	28.0	28.0	28.0	32.0	347	0.95	1.50
RAAP WTP 2	2008	44.6	39.6	40.9	38.4	39.4	32.8	34.4	40.2	30.6	32.6	32.0	35.1	441	1.21	1.58



## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF ENVIRONMENTAL QUALITY

#### Blue Ridge Regional Office

[www.deq.virginia.gov](http://www.deq.virginia.gov)

L. Preston Bryant, Jr.  
Secretary of Natural

**Lynchburg Office**  
7705 Timberlake Road  
Lynchburg, Virginia 24502  
(434) 582-5120  
Fax (434) 582-5125

August 26, 2009

David K. Paylor  
Director

Steven A. Dietrich  
Regional Director

**Roanoke Office**  
3019 Peters Creek Road  
Roanoke, Virginia 24019  
(540) 562-6700  
Fax (540) 562-6725

Ms. Paige W. Holt  
Environmental Manager  
Alliant Techsystems, Inc.  
P.O. Box 1  
Radford, VA 24143-0100

LTC Andy Munero  
Commanding Officer  
Radford Army Ammunition Plant  
P.O. Box 1  
Radford, VA 24143-0100

Re: Technical and ~~Laboratory~~ Inspection Reports  
Radford Army Ammunition Plant, Bioplant Wastewater Treatment Facilities  
VPDES Permit No. VA0000248

Dear Ms. Holt & LTC Munero:

Attached for your review are copies of the technical and laboratory inspection reports for the Radford Army Ammunition Plant, Bioplant wastewater treatment facilities and Central Laboratory. The inspections were conducted on June 18, 2009.

Please review the reports carefully. Note there are no recommendations for action associated with the technical report and there were no deficiencies noted during the laboratory inspection.

If you have any questions regarding these reports or the actions required, please contact me at the Blue Ridge Regional Office - Roanoke (540-562-6740).

Sincerely,

Troy Nipper  
Enforcement/ Compliance Specialist, Senior

#### Attachments

Copies: S. C. Hale, file - DEQ/WCRO  
S. G. Stell - DEQ/OWC (EPA Copy)



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

### West Central Regional Office

L. Preston Bryant, Jr.  
Secretary of Natural Resources

3019 Peters Creek Road, Roanoke, Virginia 24019  
(540) 562-6700 Fax (540) 562-6725  
[www.deq.virginia.gov](http://www.deq.virginia.gov)

David K. Paylor  
Director

Steven A. Dietrich  
Regional Director

September 16, 2008

LTC Jon Drushal  
Commanding Officer  
Radford Army Ammunition Plant  
P.O. Box 1  
Radford, VA 24143-0100

Re: Technical and Laboratory Inspection Reports  
Radford Army Ammunition Plant, Bioplant Wastewater Treatment Facilities  
VPDES Permit No. VA0000248

Dear Colonel Drushal:

Attached for your review are copies of the technical and laboratory inspection reports for the Radford Army Ammunition Plant, Bioplant wastewater treatment facilities and Central Laboratory. I conducted the inspections on July 14, 2008.

Please note that page 5 of the technical report summarizes one recommendation for action related to the wastewater treatment system. We request that you respond to this office within 15 days on this recommendation and provide details of actions taken and/or proposed to correct the deficiencies. All proposed actions must also include a schedule for completion.

With regard to the laboratory inspection, a deficiency was noted with the Laboratory Records section. The deficiency is discussed in detail on the first page of the laboratory report.

In view of the significance attached to proper sampling and analysis of samples for use in complying with the terms of the facility's permit, please review the attached report and make the required corrections. Within 15 days, you are required to submit a letter documenting that corrective action has been taken.

Radford Army Ammunition Plant, Bioplant Wastewater Treatment Facilities  
Technical and Laboratory Inspection Reports  
Page 2

Also, I would like to inform you of the new electronic option now available for submission of your facility's Discharge Monitoring Report (DMR) data. The Department of Environmental Quality (DEQ) now offers electronic DMR (e-DMR) submittal as an alternative to the current paper DMR submittal process. Using an electronic process for submitting effluent quality data can represent significant labor savings while increasing the timeliness, accuracy, and overall reliability of this information. The e-DMR software utilizes a universal file format to provide quick and easy transmission of data, and provides three methods for online data reporting. For more information on the e-DMR reporting system, including the participation package download, answers to frequently asked questions, and link to the e-DMR demonstration site, please visit the following website; <http://www.deq.virginia.gov/water/edmrfaq.html>.

If you have any questions regarding these reports or the actions required, please contact me at the West Central Regional Office, Roanoke (540-562-6829).

Sincerely,



Gerald A. Duff  
Compliance Inspector Senior

Attachments

Copies:            S. C. Hale, file - DEQ/WCRO  
                    S. G. Stell - DEQ/OWC (EPA Copy)  
                    LTC Jon Drushal - Radford Army Ammunition Plant

**PLANT OPERATION AND MAINTENANCE**

1. Class and number of certified operators:  
(facility wide) I – 9 (5 assigned to Bioplant), II – 9, III – 9, IV - 1  
One Class I is usually at the Bioplant. If not, a Class I operator can be paged
2. Hours per day plant is manned: 24 hours/day, 7 days/week
3. Describe adequacy of staffing.  Good  Average  Poor
4. Does the plant have an established program for training personnel?  Yes  No
5. Describe the adequacy of the training program.  Good\*  Average  Poor
6. Are preventive maintenance tasks scheduled?  Yes  No
7. Describe the adequacy of maintenance.  Good  Average  Poor
8. Does the plant experience any organic/hydraulic overloading?  
If yes, identify cause and impact on plant:
9. Any bypassing since last inspection?  Yes  No
10. Is the standby electric generator operational?  Yes\*  No  NA
11. Is the STP alarm system operational?  Yes  No  NA
12. How often is the standby generator exercised?  
Power Transfer Switch? Once/six months Weekly  
Alarm System? Weekly
13. When was the cross connection control device last tested on the potable water service? 07/25/2008
14. Is sludge being disposed in accordance with the approved sludge disposal plan?  Yes\*  No
15. Is septage received by the facility?  
Is septage loading controlled?  Yes  No  
Are records maintained?  Yes  No  NA  NA
16. Overall appearance of facility:  Good  Average  Poor

Comments: 5. The training consists of the Sacramento 100-Hour Course, VPI short school, HAZMAT transportation, and a mandatory annual safety training program.

10. The facility has two (2) power sources provided to the facility from AEP. In addition, the facility has installed a standby emergency generator capable of powering the influent pumps.
14. Sludge from this process is brought to the local transfer station and disposed of at the New River Resource Authority in Dublin, VA.

\* Responses with this symbol should be of particular concern and the investigator may want to address the problem in more detail in the Comments Section.



*b7c  
file*

## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF ENVIRONMENTAL QUALITY

L. Preston Bryant, Jr.  
Secretary of Natural Resources

West Central Regional Office  
3019 Peters Creek Road, Roanoke, Virginia 24019  
Telephone (540) 562-6700, Fax (540) 562-6725  
[www.deq.virginia.gov](http://www.deq.virginia.gov)

David K. Paylor  
Director

Steven A. Dietrich  
Regional Director

September 10, 2007

Lt. Col. Jon R. Drushal  
RAAP  
Rt. 114  
P.O. Box 1  
Radford, VA 24141

P. W. Holt  
Alliant TechSystems  
Rt. 114  
P.O. Box 1  
Radford, VA 24141

Re: Technical Inspection Report for Ancillary Outfalls  
Radford Army Ammunition Plant  
VPDES Permit No. VA0000248 (Outfalls 401, 004, 005, 006, 007, 012, 014, 017, 024)

Dear Lt. Colonel Drushal and Ms. Holt:

Attached for your review is a copy of the technical inspection report for the wastewater treatment facilities associated with the above referenced outfalls at the Radford Army Ammunition Plant. The inspection was conducted on July 19, 2007.

Please note that page 5 of the technical inspection report summarizes the recommendations for action related to the inspection of the treatment systems. We request that you respond to this office within 15 days on these recommendations and provide details of actions taken and/or proposed to correct the deficiencies. For any proposed action, please provide a schedule of completion for the item.

Also, I would like to inform you of the new electronic option now available for submission of your facility's Discharge Monitoring Report (DMR) data. The Department of Environmental Quality (DEQ) now offers electronic DMR (e-DMR) submittal as an alternative to the current paper DMR submittal process. Using an electronic process for submitting effluent quality data can represent significant labor savings while increasing the timeliness, accuracy, and overall reliability of this information. The e-DMR software utilizes a universal file format to provide quick and easy transmission of data, and provides three methods for online data reporting. For more information on the e-DMR reporting system, including the participation package download, answers to frequently asked questions, and link to the e-DMR demonstration site, please visit the following website;  
<http://www.deq.virginia.gov/water/edmrfaq.html>.

Should you have any questions regarding the report, please contact me at the West Central Regional Office, Roanoke at (540) 562-6722.

Sincerely,



Ryan L. Hendrix  
Compliance Inspector Senior

Attachments

Copies: S. C. Hale, R. L. Hendrix, File – DEQ/WCRO  
S. G. Stell – DEQ/OWC

Problems identified at last inspection:	Corrected	Not Corrected
1. The P.S. 401 mixer appears to have a warped shaft. Submit a plan of action to repair or replace the unit and, if necessary include a schedule to complete the project.	[X]	[ ]
2. The grass/brush needs removed from the berms of the P.S. 005 sludge drying/storage area. Notify this office when this project has been completed and/or submit a schedule to complete this project.	[X]	[ ]
3. The P.S. 017 basin has been replaced with a larger basin that is approximately 10 ft. deep. The overflow area is unlined and lacking rip rap. It is recommended that the overflow be lined with some type of material to prevent erosion in the event of a discharge.	[X]	[ ]
4. The brush and grass on the berms of the P.S. 024 ponds are in need of cutting. Notify this office when this project has been completed and/or submit a schedule to complete this project.	[X]	[ ]

#### SUMMARY

#### Comments:

- The estimated flow reporting for outfall 004 should be checked occasionally to verify accuracy (i.e. bucket and stop watch method).

#### Recommendations for action:

- The vegetation and debris around the PS 004 outfall needs to be removed and maintained to ensure representative sampling can be achieved. Submit documentation confirming the removal of this material.
- Since the oleum plant is no longer in operation, certain systems designed to treat the wastewater at PS 005 are no longer in operation. The neutralization system and the sludge drying/storage pit are no longer functional. Subsequently, the Operations and Maintenance (O&M) manual for PS 005 requires updating to demonstrate this operational modification. Please make the necessary O&M revisions to address these issues and submit the revisions to Kevin Harlow, Environmental Engineer, for approval.
- The dikes surrounding the sedimentation basins on PS 004, PS 005, PS 017, and PS 024 are overgrown with vegetation. The vegetation needs to be maintained more frequently, so the dikes can be readily and frequently inspected for burrowing animals and any other conditions which may compromise their integrity. Submit a plan of action and schedule to address this issue.

Items identified at last inspection:

Corrected      Not Corrected

Two pumps (#3 and #5) at the influent pump station were leaking and the drive shafts wobbling. This problem was identified during the last inspection.

Two diffusers in the east side of the EQ remain broken from the previous inspection. Air continues to blow out at the influent end of the diffuser lines causing the second line of diffusers to receive no air.

3. Repair or replace the leaking generator radiator.

4. Store the nutrient supplement diaphragm transfer pump located behind the pH adjustment building when the unit is not in use.

5. Repair or replace the broken chain drive for the out of order outdoor rotating biological contactor (RBC) and return to service.

---

## SUMMARY

### Recommendations for action:

1. Repair the leaking check valve for the #4 pump at the influent pump station.

## LABORATORY INSPECTION REPORT SUMMARY

10/01

Facility Name:	Radford Army Ammunition Plant Bioplant and Central Laboratories	VPDES NO:	VA0000248	INSPECTION DATE:	07/14/2008
LABORATORY RATING		NO DEFICIENCIES			
	X	DEFICIENCIES			
<b>LABORATORY RECORDS</b>					

A deficiency was noted with the Laboratory Records section. The following item must be corrected.

- The analytical test method for the temperature parameter currently employed by the Bioplant staff must be cited on the bench sheets. A letter from Lou Martin dated June 4, 2007 indicated this deficiency had been corrected. Based on the bench sheets provided to the inspector, this deficiency remains. Please cite one of the currently approved methods for this parameter on the facility's bench sheets. Currently approved tests are from Standard Methods for the Examination of Water and Wastewater, #2550, for the 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup> Editions or #2550-00 for the online version. The particular edition in use by the facility's staff must be cited on the bench sheets. Please submit a photocopy of one completed pH Meter Maintenance/Measurement bench sheet showing all corrected actions have been taken.

**GENERAL SAMPLING AND ANALYSIS**

No deficiencies were noted with the General Sampling and Analysis section.

**LABORATORY EQUIPMENT**

No deficiencies were noted with the Laboratory Equipment section.

**PARAMETER SUMMARY****pH**

No deficiencies were noted for the analysis of the pH parameter.

**pH Automated Electrode**

No deficiencies were noted for the analysis of the pH Automated Electrode parameter.

**Temperature**

No deficiencies were noted for the analysis of the Temperature parameter.

## **Attachment D**

### **Ambient Water Quality Information**

- STORET Data (Station 4ASRE022.71)**
- 2008 305b Watershed Summary Report  
(Excerpt)**

## STORET Data

Station\_ID 9-NEW081.72

## Dry Season

Date	pH	Temp (C)	Hardness
11/4/97	7.77	13.9	57.3
11/20/97	7.9	9	
12/2/97	7.81	7	
6/4/98	7.84	19	
7/28/98	7.78	23.4	
8/12/98	7.79	23.4	
9/1/98	7.73	23.3	
10/20/98	7.98	17.1	
11/17/98	7.78	12.8	
12/8/98	7.38	12.4	
6/22/99	7.92	18.5	
7/26/99	7.9	22.5	
8/17/99	7.71	23	
9/21/99	7.9	19.1	
10/13/99	7.84	16.9	
11/16/99	7.51	9	
6/26/00	7.68	20.9	62
7/26/00	7.55	20.6	72.6
8/16/00	7.63	23.7	72.4
9/19/00	7.49	19.1	75.9
10/18/00	7.71	16.2	83.4
11/29/00	8.01	8.5	63.3
12/27/00	8.3	6.5	65.4
6/25/01	7.27	17.3	114
7/17/01	8.1	21.8	52.1
8/15/01	7.61	22.1	68.9
9/11/01	7.72	21.4	57.6
10/25/01	8.33	17.5	40.1
12/18/01	8.48	10.6	44.5
6/25/02	7.28	19.79	79.2
7/30/02	7.23	23.08	74.5
8/20/02	7.23	22.9	62.1
9/19/02	7.61	21.75	101
10/31/02	7.13	13.2	68.7
11/20/02	7.6	10.55	106
12/12/02	7.64	7.02	69.1
6/12/03	7.79	17.26	103
8/19/03	7.37	22.46	
10/27/03	7.72	14.41	
12/22/03	7.6	8.2	
6/22/04	7.47	20.9	
8/25/04	7.63	23.3	
10/27/04	7.1	14.3	
12/1/04	7.45	11.11	
6/7/05	7.8	17.7	
8/10/05	7.2	24	
10/27/05	7.8	13.1	
12/19/05	7.5	5.4	
6/8/06	7	17.6	
8/14/06	7.6	23.2	
10/5/06	7.2	18.9	
12/14/06	8.2	6.2	
7/17/07	7.7	23.1	
9/27/07	8.2	22.2	
11/29/07	8.1	9.7	

Stat. Desc. RT. 11 BRIDGE AT RADFORD

## Wet Season

Date	pH	Temp (C)	Hardness
1/22/98	7.65	6	
2/12/98	8.23	5.5	
3/19/98	8	7.9	
4/15/98	7.71	12.4	
5/11/98	8.04	14.1	
1/28/99	7.89	6.4	
2/10/99	8.16	6.3	
3/30/99	8.51	8.1	
4/26/99	8.18	12.5	
5/10/99	8.2	13.8	
1/26/00	7.52	1.9	65.1
2/14/00	7.61	4.3	60.9
3/29/00	7.94	11.4	61
4/6/00	7.99	10.6	59
5/24/00	7.9	16.3	92
1/17/01	8.21	3.3	75.3
2/6/01	8.4	8.2	155
3/8/01	8.49	6.1	28.1
4/10/01	7.89	13.1	73.4
5/17/01	8.09	13.5	112
1/23/02	8.01	6	67.8
2/25/02	8.24	8.1	47
3/18/02	8.09	8.5	109
4/30/02	7.72	13.59	81.2
5/30/02	7.58	16.98	89.3
1/22/03	8.05	4.93	93.8
2/11/03	8.23	3.1	73.4
3/10/03	7.93	8.27	91.4
4/10/03	8.12	10.56	178
2/18/04	7.75	5.14	
4/21/04	7.59	13.73	
2/17/05	8.06	4.63	
4/19/05	8.11	12.08	
2/21/06	7.8	5.1	
4/6/06	6.8	9.2	
1/17/07	8	7.1	
3/20/07	8.2	8.8	
5/9/07	8.3	14.8	
1/23/08	8	5.6	
3/5/08	8.1	5.9	

Statistic	pH	Temp (C)	Hardness
Average			78.19
10th %ile	7.32		
90th %ile	8.22		
90% (Wet)		13.83	
90% (Dry)		23.26	

Due Date	Cburg STP	Lower Stroubles	Peppers Ferry
10-Jan-2007	1.93	5.09	4.40
10-Feb-2007	2.25	6.11	5.10
10-Mar-2007	2.03	5.84	4.00
10-Apr-2007	2.47	6.52	4.90
10-May-2007	2.32	6.07	4.50
10-Jun-2007	2.07	5.05	3.50
10-Jul-2007	2.01	4.16	3.30
10-Aug-2007	2.21	4.04	3.20
10-Sep-2007	1.76	4.58	2.80
10-Oct-2007	1.91	5.15	3.00
10-Nov-2007	2.32	5.37	3.90
10-Dec-2007	1.78	4.84	3.20
10-Jan-2008	1.93	4.42	3.30
10-Feb-2008	1.87	4.78	3.60
10-Mar-2008	1.98	5.51	4.10
10-Apr-2008	1.98	4.97	3.80
10-May-2008	2.24	6.05	4.70
10-Jun-2008	1.98	4.86	3.80
10-Jul-2008	1.83	3.92	3.00
10-Aug-2008	1.96	4.05	3.20
10-Sep-2008	2.07	4.26	3.50
10-Oct-2008	2.12	5.13	3.80
10-Nov-2008	1.89	5.05	3.70
10-Dec-2008	1.97	4.75	3.70
10-Jan-2009	2.31	4.77	4.40
10-Feb-2009	2.30	5.00	3.70
10-Mar-2009	1.93	5.15	4.30
10-Apr-2009	2.58	5.72	5.90
10-May-2009	2.38	5.56	5.30
10-Jun-2009	3.93	6.31	6.10
10-Jul-2009	3.56	5.81	6.80
10-Aug-2009	2.77	4.47	3.60
10-Sep-2009	2.17	4.78	3.30
10-Oct-2009	2.29	4.83	3.80
10-Nov-2009	2.18	5.14	3.80
10-Dec-2009	2.79	6.07	5.10
10-Jan-2010	3.69	7.17	7.40
10-Feb-2010	3.30	6.55	6.90
Minimum	1.76	3.92	2.80

**STORET Data - Station 09-NEW081.72**  
**Parameters with Water Quality Standards**

Parameter_Name	Count	Average
ANTIMONYSB,DISS UG/L	2	0.00
ARSENIC AS,DISS UG/L	2	0.35
CADMIUM CD,DISS UG/L	2	0.00
CHLORIDE TOTAL MG/L	43	7.96
CHROMIUMCR,DISS UG/L	2	0.18
COPPER CU,DISS UG/L	2	0.65
LEAD PB,DISS UG/L	2	0.00
MANGNESEMN,DISS UG/L	2	14.32
MERCURY HG,DISS UG/L	1	0.00
NICKEL NI,DISS UG/L	2	0.39
NO3-N TOTAL MG/L	66	0.89
SILVER AG,DISS UG/L	2	0.00
SULFATE SO4-TOT MG/L	43	7.87
THALLIUMTL,DISS UG/L	2	0.00
ZINC ZN,DISS UG/L	2	3.68



# 2008 Impaired Waters

## Categories 4 and 5 by DCR Watershed\*

### New River Basin

Fact Sheet prepared for DCR Watershed: N22\*

Cause Group Code: N29R-01-PCB

New River, Claytor Lake, Peak Creek and Reed Creek

Location: The impairment begins at the I-77 bridge crossing the New River and extends downstream to the VA/WVA State Line and includes the tributaries Peak Creek and Reed Creek as described below.

City / County: Giles Co.      Montgomery Co.      Pulaski Co.      Radford City

Use(s): Fish Consumption

Cause(s) /

VA Category: PCB in Fish Tissue/ 5A

The Virginia Department of Health (VDH) issued a fish consumption advisory on August 6, 2001 for polychlorinated biphenyls (PCBs) for the lower portion of the New River (Rt. 114 Bridge downstream to the VA / WVA State Line - 52.0 miles) based on fish tissue collections from Carp. An Advisory extension to Claytor dam was issued 8/06/2003 (11.47 miles) recommends that no carp be consumed in these waters and no more than two meals per month of flathead and channel catfish. The VDH PCB Fish Consumption Advisory was further extended upstream on the New River (13 miles) to the I-77 Bridge to include the lower portions of Peak Creek (4.95 miles), Reed Creek (16.35 miles) and Claytor Lake (4,287 acres) on 12/02/2004. The VDH advises consumption should not exceed two meals per month for carp and smallmouth bass. The VDH level of concern is 50 parts per billion (ppb) in fish tissue.

There are eight fish tissue collection sites within the 2008 data window reporting exceedences of the WQS based 54 ppb fish tissue value (TV). These data are reviewed by the VDH in making an advisory determination. A complete listing of collection sites and associated fish tissue data are available at <http://www.deq.virginia.gov/fishtissue/fishtissue.html>. A more detailed presentation of the data can also be found using an interactive mapping application at <http://gisweb.deq.state.va.us/>. The VDH Advisory information is also available via the web at <http://www.vdh.virginia.gov/Epidemiology/PublicHealthToxicology/Advisories/>.

Assessment Unit / Water Name / Description	Cause Category / Name	First Listed	Cycle TMDL Schedule	Size
VAW-N22R_NEW01A00 / New River Lower 1 / The New River mainstem from the confluence of Back Creek downstream to the Watershed Boundary at the Montgomery / Giles County Line.	5A PCB in Fish Tissue	2002	2014	3.47
VAW-N22R_NEW02A00 / New River Lower 2 / New River mainstem from the Radford Army Arsenal Plant downstream intake near Whitethorne downstream to the confluence of Back Creek.	5A PCB in Fish Tissue	2002	2014	2.88
VAW-N22R_NEW03A00 / New River Middle 1 / New River mainstem from the confluence of Stroubles Creek downstream to the Radford Army Arsenal Plant downstream water intake near Whitethorne.	5A PCB in Fish Tissue	2002	2014	4.52
VAW-N22R_NEW04A00 / New River Middle 2 / New River mainstem from the Radford Army Arsenal Plant upstream intake/Pepper's Ferry Region POTW outfall downstream to the confluence of Stroubles Creek.	5A PCB in Fish Tissue	2002	2014	2.35
VAW-N22R_NEW05A00 / New River Upper / New River mainstem from the Blacksburg /Christiansburg /VPI Authority intake at Rt. 114 downstream to the Radford Army Arsenal Plant upstream intake / Pepper's Ferry Regional POTW outfall.	5A PCB in Fish Tissue	2002	2014	1.77



# 2008 Impaired Waters

## Categories 4 and 5 by DCR Watershed\*

### New River Basin

#### Fact Sheet prepared for DCR Watershed: N22\*

Assessment Unit / Water Name / Description	Cause Category / Name	Cycle First Listed	TMDL Schedule	Size
VAW-N22R_NEW06A00 / New River Upper 2 / New River mainstem from the Watershed Boundary at the Crab Creek confluence downstream to the Blacksburg /Christiansburg /VPI Authority intake.	5A PCB in Fish Tissue	2006	2014	1.73

New River, Claytor Lake, Peak Creek and Reed Creek DCR Watershed: N22*	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Fish Tissue - Total Impaired Size by Water Type:			16.72

#### Sources:

Source Unknown

\*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

## **Attachment E**

### **Wasteload and Limit Calculations**

- **Mixing Zone Calculations (MIXER)**
- **Wasteload Allocation Spreadsheet**
- **STATS Program Results**
- **DO Model**

RAAP; VA0000248; Form 2C Data with Water Quality Standards

Param	Units	004	005	006	007	014	024	026	029
Copper, Tot.	ug/l				26.7				12.7
Iron, Tot.	mg/l		0.102	0.144	0.305			0.15	
Lead, Tot.	ug/l				1.2				26.2
Manganese, Tot.	mg/l				0.055				
Nickel, Tot.	ug/l				38.7				10
Zinc, Tot.	ug/l				10				19.9
2,4-Dinitrotoluene	ug/l								38.9
Ammonia	mg/l					13.6			
Bis(2-Ethylhexyl) Phthalate	mg/l	0.035							
Chromium, Tot.	ug/l				9.5				5
Fecal	col/100ml	29							
Sulfate	mg/l	38.6	7	13.3	1260	32.2	43.4	76.9	

**VA0000248 - Form 2F Data for Parameters with Water Quality Standards**

Param	Units	004	012	014	041	050	054
Ammonia	mg/L				0.27	0.25	
Chrom VI, Diss.	mg/l	0.003	0.002		0.003		0.002
Copper, Tot.	mg/l						
Lead, Tot.	mg/l						
Nickel, Tot.	mg/l						
Zinc, Diss	mg/l					0.054	
Zinc, Tot.	mg/l					0.095	

VA0000248 - OCPSF Flows  
Outfalls 007 & 029

Month	029 Flow (gal/day)	029 OCPSF Flow (gal/day)	007 Flow (gal/day)	007 OCPSF Flow (gal/day)	007 non- OCPSF Flow (gal/day)
Jun-05	899291	636281	4489797	2606473	1883324
Jul-05	760072	537492	3915387	1400047	2515340
Aug-05	852921	613435	4770291	2674945	2095346
Sep-05	737919	531941	4796800	2833788	1963012
Oct-05	849969	640287	4945807	3055013	1890794
Nov-05	1041009	816119	4592533	2941763	1650770
Dec-05	1116211	896751	3711516	2317151	1394365
Jan-06	1208911	974774	4168000	2614363	1553637
Feb-06	1203581	956365	4399786	2694349	1705437
Mar-06	1141504	907666	4902162	2960088	1942074
Apr-06	952730	731660	4189833	2885088	1304745
May-06	912564	671746	3624871	2660985	963886
Jun-06	921099	590886	5013800	3128181	1885619
Jul-06	918756	705676	4343484	2311247	2032237
Aug-06	820639	612439	4169000	2811575	1357425
Sep-06	906980	697621	4882233	2627486	2254747
Oct-06	941808	681310	4883968	2873827	2010141
Nov-06	1087913	826969	4505300	2434110	2071190
Dec-06	1080432	808220	4517733	2426062	2091671
Jan-07	1263958	1063731	4533613	2279303	2254310
Feb-07	1216571	1029713	4434214	2343072	2091142
Mar-07	1203107	1036180	4605354	2347877	2257477
Apr-07	1040604	855202	4473866	1959062	2514804
May-07	877592	743578	4304903	1982083	2322820
Jun-07	817560	702578	4883534	2310750	2572784
Jul-07	899003	792507	4924097	2648805	2275292
Aug-07	710099	627265	2769258	1658983	1110275
Sep-07	767456	641898	5177267	2548739	2628528
Oct-07	835556	655811	4935548	2526839	2408709
Nov-07	847429	671404	4265467	2356148	1909319
Dec-07	796076	627690	3990258	2124763	1865495
Jan-08	937345	709758	4602967	2265790	2337177
Feb-08	862821	682865	4250635	2182921	2067714
Mar-08	820027	654729	4308967	2400811	1908156
Apr-08	815723	635693	4566433	2364714	2201719
May-08	757906	563772	4665419	2289114	2376305
Jun-08	739511	488928	4603867	2110667	2493200
Jul-08	879861	617535	3657709	1869967	1787742
Aug-08	822786	551278	4813613	2416548	2397065
Sep-08	650157	464092	4737800	2329186	2408614
Oct-08	791351	598312	4989033	2332980	2656053
Nov-08	802355	651129	4705767	2147632	2558135
Dec-08	1120685	984027	4129742	1929029	2200713
Jan-09	1143765	991510	4373387	2221201	2152186
Feb-09	979988	836628	4182071	2214219	1967852
Mar-09	1028401	882473	4121774	2113565	2008209
Apr-09	886130	705643	3939833	2311725	1628108
Average	929109	729863	4441887	2400916	2040972

## Mixing Zone Predictions for

VA0000248 - 004

Effluent Flow = 0.04 MGD

Stream 7Q10 = 559 MGD

Stream 30Q10 = 646 MGD

Stream 1Q10 = 449 MGD

Stream slope = 0.001 ft/ft

Stream width = 550 ft

Bottom scale = 3

Channel scale = 1

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### Mixing Zone Predictions @ 7Q10

Depth = 2.1898 ft

Length = 149513.22 ft

Velocity = .7185 ft/sec

Residence Time = 2.4084 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 83.04% of the 7Q10 is used.

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### Mixing Zone Predictions @ 30Q10

Depth = 2.389 ft

Length = 138982.26 ft

Velocity = .7611 ft/sec

Residence Time = 2.1135 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 94.63% of the 30Q10 is used.

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### Mixing Zone Predictions @ 1Q10

Depth = 1.9193 ft

Length = 166987.39 ft

Velocity = .6585 ft/sec

Residence Time = 70.4429 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.42% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 004

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	1.42 %			Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L		
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	83.04 %			90% Temp (Annual) =	23.3 deg C		
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =	94.63 %			90% Temp (Wet season) =	13.8 deg C		
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	528 MGD	Wet Season - 1Q10 Mix =	100 %			90% Maximum pH =	8.22 SU		
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %			10% Maximum pH =	7.32 SU		
Tier Designation (1 or 2) =	2	30Q5 =	725 MGD					Discharge Flow =	0.04 MGD		
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	1.2E+07	1.8E+07	--	--	6.7E+01	9.9E+01	--	--	1.2E+06	1.8E+06	--	--	1.2E+06	1.8E+06	
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	1.1E+05	1.7E+05	--	--	6.1E-01	9.3E-01	--	--	1.1E+04	1.7E+04	--	--	1.1E+04	1.7E+04	
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	1.9E+04	9.5E+04	--	--	5.1E-02	2.5E-01	--	--	1.9E+03	9.5E+03	--	--	1.9E+03	9.5E+03	
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	4.8E+02	--	1.9E+01	1.9E+01	7.5E-01	--	4.9E-05	5.0E-05	8.4E+03	--	1.9E+00	1.9E+00	4.8E+02	--	1.9E+00	1.9E+00	
Ammonia-N (mg/l) (Yearly)	0	3.68E+00	9.86E-01	--	--	5.9E+02	1.5E+04	--	--	9.20E-01	2.46E-01	--	--	1.0E+04	4.0E+03	--	--	5.9E+02	4.0E+03	--	--	
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	4.9E+04	4.6E+04	--	--	9.20E-01	4.34E-01	--	--	1.2E+04	1.2E+04	--	--	1.2E+04	1.2E+04	--	--	
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	1.5E+08	7.3E+08	--	--	8.3E+02	4.0E+03	--	--	1.5E+07	7.3E+07	--	--	1.5E+07	7.3E+07	
Antimony	0	--	--	--	5.6E+00	6.4E+02	--	--	1.0E+05	1.2E+07	--	--	5.6E-01	6.4E+01	--	--	1.0E+04	1.2E+06	--	--	1.0E+04	1.2E+06
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	5.4E+04	1.7E+06	1.7E+05	--	8.5E+01	3.8E+01	1.3E+00	--	9.5E+05	5.2E+05	1.7E+04	--	5.4E+04	5.2E+05	1.7E+04	--	
Barium	0	--	--	--	2.0E+03	--	--	3.6E+07	--	--	--	2.0E+02	--	--	--	3.6E+06	--	--	--	3.6E+06	--	
Benzene <sup>c</sup>	0	--	--	--	2.2E+01	5.1E+02	--	--	8.4E+05	1.9E+07	--	--	2.2E+00	5.1E+01	--	--	8.4E+04	1.9E+06	--	--	8.4E+04	1.9E+06
Benzidine <sup>c</sup>	0	--	--	--	8.6E-04	2.0E-03	--	--	3.3E+01	7.6E+01	--	--	8.6E-05	2.0E-04	--	--	3.3E+00	7.6E+00	--	--	3.3E+00	7.6E+00
Benzo (a) anthracene <sup>c</sup>	0	--	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02
Benzo (a) pyrene <sup>c</sup>	0	--	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02
Bis2-Chloroethyl Ether <sup>f</sup>	0	--	--	--	3.0E-01	5.3E+00	--	--	1.1E+04	2.0E+05	--	--	3.0E-02	5.3E-01	--	--	1.1E+03	2.0E+04	--	--	1.1E+03	2.0E+04
Bis2-Chloroisopropyl Ether	0	--	--	--	1.4E+03	6.5E+04	--	--	2.5E+07	1.2E+09	--	--	1.4E+02	6.5E+03	--	--	2.5E+06	1.2E+08	--	--	2.5E+06	1.2E+08
Bis 2-Ethylhexyl Phthalate <sup>f</sup>	0	--	--	--	1.2E+01	2.2E+01	--	--	4.6E+05	8.4E+05	--	--	1.2E+00	2.2E+00	--	--	4.6E+04	8.4E+04	--	--	4.6E+04	8.4E+04
Bromoform <sup>c</sup>	0	--	--	--	4.3E+01	1.4E+03	--	--	1.6E+06	5.3E+07	--	--	4.3E+00	1.4E+02	--	--	1.6E+05	5.3E+06	--	--	1.6E+05	5.3E+06
Butylbenzylphthalate	0	--	--	--	1.5E+03	1.9E+03	--	--	2.7E+07	3.4E+07	--	--	1.5E+02	1.9E+02	--	--	2.7E+06	3.4E+06	--	--	2.7E+06	3.4E+06
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	4.8E+02	1.1E+04	9.1E+04	--	7.4E-01	2.3E-01	5.0E-01	--	8.3E+03	3.3E+03	9.1E+03	--	4.8E+02	3.3E+03	9.1E+03	--	
Carbon Tetrachloride <sup>c</sup>	0	--	--	--	2.3E+00	1.6E+01	--	--	8.7E+04	6.1E+05	--	--	2.3E-01	1.6E+00	--	--	8.7E+03	6.1E+04	--	--	8.7E+03	6.1E+04
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	3.8E+02	5.0E+01	3.0E+02	3.1E+02	6.0E-01	1.1E-03	8.0E-04	8.1E-04	6.7E+03	1.5E+01	3.0E+01	3.1E+01	3.8E+02	1.5E+01	3.0E+01	3.1E+01	
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	1.4E+08	2.6E+09	4.4E+09	--	2.2E+05	6.3E+04	3.2E+04	--	2.4E+09	7.8E+08	4.4E+08	--	1.4E+08	7.8E+08	4.4E+08	--	
TRC	0	1.9E+01	1.1E+01	--	--	3.0E+03	1.3E+05	--	--	4.8E+00	2.8E+00	--	--	5.3E+04	3.8E+04	--	--	3.0E+03	3.8E+04	--	--	
Chlorobenzene	0	--	--	--	1.3E+02	1.6E+03	--	--	2.4E+06	2.9E+07	--	--	1.3E+01	1.6E+02	--	--	2.4E+05	2.9E+06	--	--	2.4E+05	2.9E+06

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>f</sup>	0	--	--	4.0E+00	1.3E+02	--	--	1.5E+05	4.9E+06	--	--	4.0E-01	1.3E+01	--	--	1.5E+04	4.9E+05	--	--	1.5E+04	4.9E+05
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	6.2E+05	2.0E+08	--	--	3.4E+01	1.1E+03	--	--	6.2E+05	2.0E+07	--	--	6.2E+05	2.0E+07
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.8E+07	2.9E+07	--	--	1.0E+02	1.6E+02	--	--	1.8E+06	2.9E+06	--	--	1.8E+06	2.9E+06
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	1.5E+06	2.7E+06	--	--	8.1E+00	1.5E+01	--	--	1.5E+05	2.7E+05	--	--	1.5E+05	2.7E+05
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.3E+01	4.8E+02	--	--	2.1E-02	1.0E-02	--	--	2.3E+02	1.4E+02	--	--	1.3E+01	1.4E+02	--	--
Chromium III	0	4.6E+02	6.0E+01	--	--	7.5E+04	7.0E+05	--	--	1.2E+02	1.5E+01	--	--	1.3E+06	2.1E+05	--	--	7.5E+04	2.1E+05	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	2.6E+03	1.3E+05	--	--	4.0E+00	2.8E+00	--	--	4.5E+04	3.8E+04	--	--	2.6E+03	3.8E+04	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	1.8E+06	--	--	--	1.0E+01	--	--	--	1.8E+05	--	--	--	1.8E+05	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	3.8E-04	1.8E-03	--	--	1.4E+01	6.8E+01	--	--	1.4E+01	6.8E+01
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	1.6E+03	7.7E+04	2.4E+07	--	3.1E+00	2.3E+00	1.3E+02	--	2.8E+04	2.3E+04	2.4E+06	--	1.6E+03	2.3E+04	2.4E+06	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	3.5E+03	6.0E+04	2.5E+06	2.9E+08	5.5E+00	1.3E+00	1.4E+01	1.6E+03	6.2E+04	1.8E+04	2.5E+05	2.9E+07	3.5E+03	1.8E+04	2.5E+05	2.9E+07
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	1.2E+02	1.2E+02	--	--	3.1E-04	3.1E-04	--	--	1.2E+01	1.2E+01	--	--	1.2E+01	1.2E+01
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	8.4E+01	8.4E+01	--	--	2.2E-04	2.2E-04	--	--	8.4E+00	8.4E+00	--	--	8.4E+00	8.4E+00
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.8E+02	1.2E+01	8.4E+01	8.4E+01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	3.1E+03	3.5E+00	8.4E+00	8.4E+00	1.8E+02	3.5E+00	8.4E+00	8.4E+00
Demeton	0	--	--	1.0E-01	--	--	--	1.2E+03	--	--	--	2.5E-02	--	--	--	3.5E+02	--	--	--	3.5E+02	--
Diazinon	0	1.7E-01	1.7E-01	--	--	2.7E+01	2.0E+03	--	--	4.3E-02	4.3E-02	--	--	4.8E+02	5.9E+02	--	--	2.7E+01	5.9E+02	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	7.6E+06	2.4E+07	--	--	4.2E+01	1.3E+02	--	--	7.6E+05	2.4E+06	--	--	7.6E+05	2.4E+06
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	5.8E+06	1.7E+07	--	--	3.2E+01	9.6E+01	--	--	5.8E+05	1.7E+06	--	--	5.8E+05	1.7E+06
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	1.1E+06	3.4E+06	--	--	6.3E+00	1.9E+01	--	--	1.1E+05	3.4E+05	--	--	1.1E+05	3.4E+05
3,3-Dichlorobenzidine <sup>f</sup>	0	--	--	2.1E-01	2.8E-01	--	--	8.0E+03	1.1E+04	--	--	2.1E-02	2.8E-02	--	--	8.0E+02	1.1E+03	--	--	8.0E+02	1.1E+03
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	2.1E+05	6.5E+06	--	--	5.5E-01	1.7E+01	--	--	2.1E+04	6.5E+05	--	--	2.1E+04	6.5E+05
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	1.4E+05	1.4E+07	--	--	3.8E-01	3.7E+01	--	--	1.4E+04	1.4E+06	--	--	1.4E+04	1.4E+06
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	6.0E+06	1.3E+08	--	--	3.3E+01	7.1E+02	--	--	6.0E+05	1.3E+07	--	--	6.0E+05	1.3E+07
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	2.5E+06	1.8E+06	--	--	1.4E+01	1.0E+03	--	--	2.5E+05	1.8E+07	--	--	2.5E+05	1.8E+07
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.4E+06	5.3E+06	--	--	7.7E+00	2.9E+01	--	--	1.4E+05	5.3E+05	--	--	1.4E+05	5.3E+05
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.8E+06	--	--	--	1.0E+01	--	--	--	1.8E+05	--	--	--	1.8E+05	--
1,2-Dichloropropane <sup>f</sup>	0	--	--	5.0E+00	1.5E+02	--	--	1.9E+05	5.7E+06	--	--	5.0E-01	1.5E+01	--	--	1.9E+04	5.7E+05	--	--	1.9E+04	5.7E+05
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	1.3E+05	8.0E+05	--	--	3.4E-01	2.1E+01	--	--	1.3E+04	8.0E+05	--	--	1.3E+04	8.0E+05
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	3.8E+01	6.5E+02	2.0E+01	2.1E+01	6.0E-02	1.4E-02	5.2E-05	5.4E-05	6.7E+02	2.0E+02	2.0E+00	2.1E+00	3.8E+01	2.0E+02	2.0E+00	2.1E+00
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	3.1E+08	8.0E+08	--	--	1.7E+03	4.4E+03	--	--	3.1E+07	8.0E+07	--	--	3.1E+07	8.0E+07
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	6.9E+06	1.5E+07	--	--	3.8E+01	8.5E+01	--	--	6.9E+05	1.5E+06	--	--	6.9E+05	1.5E+06
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	4.9E+09	2.0E+10	--	--	2.7E+04	1.1E+05	--	--	4.9E+08	2.0E+09	--	--	4.9E+08	2.0E+09
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	3.6E+07	8.2E+07	--	--	2.0E+02	4.5E+02	--	--	3.6E+06	8.2E+06	--	--	3.6E+06	8.2E+06
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	1.3E+06	9.6E+07	--	--	6.9E+00	5.3E+02	--	--	1.3E+05	9.6E+06	--	--	1.3E+05	9.6E+06
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	2.4E+05	5.1E+06	--	--	1.3E+00	2.8E+01	--	--	2.4E+04	5.1E+05	--	--	2.4E+04	5.1E+05
2,4-Dinitrodluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	4.2E+04	1.3E+06	--	--	1.1E-01	3.4E+00	--	--	4.2E+03	1.3E+05	--	--	4.2E+03	1.3E+05
Dioxin, 2,3,7,8-tetrachlorobenzene-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	9.1E-04	9.2E-04	--	--	5.0E-09	5.1E-09	--	--	9.1E-05	9.2E-05	--	--	9.1E-05	9.2E-05
1,2-Diphenylhydrazine <sup>f</sup>	0	--	--	3.6E-01	2.0E+00	--	--	1.4E+04	7.6E+04	--	--	3.6E-02	2.0E-01	--	--	1.4E+03	7.6E+03	--	--	1.4E+03	7.6E+03
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.5E+01	6.5E+02	1.1E+06	1.6E+06	5.5E-02	1.4E-02	6.2E+00	8.9E+00	6.2E+02	2.0E+02	1.1E+05	1.6E+05	3.5E+01	2.0E+02	1.1E+05	1.6E+05
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.5E+01	6.5E+02	1.1E+06	1.6E+06	5.5E-02	1.4E-02	6.2E+00	8.9E+00	6.2E+02	2.0E+02	1.1E+05	1.6E+05	3.5E+01	2.0E+02	1.1E+05	1.6E+05
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	3.5E+01	6.5E+02	--	--	5.5E-02	1.4E-02	--	--	6.2E+02	2.0E+02	--	--	3.5E+01	2.0E+02	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	1.1E+06	1.6E+06	--	--	6.2E+00	8.9E+00	--	--	1.1E+05	1.6E+05	--	--	1.1E+05	1.6E+05
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.4E+01	4.2E+02	1.1E+03	1.1E+03	2.2E-02	9.0E-03	5.9E-03	6.0E-03	2.4E+02	1.3E+02	1.1E+02	1.1E+02	1.4E+01	1.3E+02	1.1E+02	1.1E+02
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	5.3E+03	5.4E+03	--	--	2.9E-02	3.0E-02	--	--	5.3E+02	5.4E+02	--	--	5.3E+02	5.4E+02

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	9.6E+06	3.8E+07	--	--	5.3E+01	2.1E+02	--	--	9.6E+05	3.8E+06	--	--	9.6E+05	3.8E+06	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	2.4E+06	2.5E+06	--	--	1.3E+01	1.4E+01	--	--	2.4E+05	2.5E+05	--	--	2.4E+05	2.5E+05	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	2.0E+07	9.6E+07	--	--	1.1E+02	5.3E+02	--	--	2.0E+06	9.6E+06	--	--	2.0E+06	9.6E+06	
Foaming Agents	0	--	--	5.0E+02	--	--	--	9.1E+06	--	--	--	5.0E+01	--	--	--	9.1E+05	--	--	--	9.1E+05	--	
Guthion	0	--	1.0E-02	--	--	--	1.2E+02	--	--	--	2.5E-03	--	--	--	3.5E+01	--	--	--	3.5E+01	--	--	
Heptachlor C	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	8.3E+01	4.4E+01	3.0E+01	3.0E+01	1.3E-01	9.5E-04	7.9E-05	7.9E-05	1.5E+03	1.3E+01	3.0E+00	3.0E+00	8.3E+01	1.3E+01	3.0E+00	3.0E+00	
Heptachlor Epoxide F	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	8.3E+01	4.4E+01	1.5E+01	1.5E+01	1.3E-01	9.5E-04	3.9E-05	3.9E-05	1.5E+03	1.3E+01	1.5E+00	1.5E+00	8.3E+01	1.3E+01	1.5E+00	1.5E+00	
Hexachlorobenzene E	0	--	--	2.8E-03	2.9E-03	--	--	1.1E+02	1.1E+02	--	--	2.8E-04	2.9E-04	--	--	1.1E+01	1.1E+01	--	--	1.1E+01	1.1E+01	
Hexachlorobutadiene F	0	--	--	4.4E+00	1.8E+02	--	--	1.7E+05	6.8E+06	--	--	4.4E-01	1.8E+01	--	--	1.7E+04	6.8E+05	--	--	1.7E+04	6.8E+05	
Hexachlorocyclohexane																						
Alpha-BHC C	0	--	--	2.6E-02	4.9E-02	--	--	9.9E+02	1.9E+03	--	--	2.6E-03	4.9E-03	--	--	9.9E+01	1.9E+02	--	--	9.9E+01	1.9E+02	
Hexachlorocyclohexane Beta BHC C	0	--	--	9.1E-02	1.7E-01	--	--	3.5E+03	6.5E+03	--	--	9.1E-03	1.7E-02	--	--	3.5E+02	6.5E+02	--	--	3.5E+02	6.5E+02	
Hexachlorocyclohexane																						
Gamma-BHC (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.5E+02	--	3.7E+04	6.8E+04	2.4E-01	--	9.8E-02	1.8E-01	2.7E+03	--	3.7E+03	6.8E+03	1.5E+02	--	3.7E+03	6.8E+03	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	7.3E+05	2.0E+07	--	--	4.0E+00	1.1E+02	--	--	7.3E+04	2.0E+06	--	--	7.3E+04	2.0E+06	
Hexachloroethane F	0	--	--	1.4E+01	3.3E+01	--	--	5.3E+05	1.3E+08	--	--	1.4E+00	3.3E+00	--	--	5.3E+04	1.3E+05	--	--	5.3E+04	1.3E+05	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.3E+04	--	--	--	5.0E-01	--	--	--	7.0E+03	--	--	--	7.0E+03	--	--	
Indeno (1,2,3-cd) pyrene C	0	--	--	3.8E-02	1.8E-01	--	--	1.4E+03	6.8E+03	--	--	3.8E-03	1.8E-02	--	--	1.4E+02	6.8E+02	--	--	1.4E+02	6.8E+02	
Iron	0	--	--	3.0E+02	--	--	--	5.4E+06	--	--	--	3.0E+01	--	--	--	5.4E+05	--	--	--	5.4E+05	--	
Isophorone F	0	--	--	3.5E+02	9.6E+03	--	--	1.3E+07	3.6E+08	--	--	3.5E+01	9.6E+02	--	--	1.3E+06	3.6E+07	--	--	1.3E+06	3.6E+07	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	8.7E+01	9.8E+00	1.5E+01	--	1.4E+04	1.1E+05	2.7E+05	--	2.2E+01	2.5E+00	1.5E+00	--	2.4E+05	3.4E+04	2.7E+04	--	1.4E+04	3.4E+04	2.7E+04	--	
Malathion	0	--	1.0E-01	--	--	--	1.2E+03	--	--	--	2.5E-02	--	--	--	3.5E+02	--	--	--	3.5E+02	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	6.5E+05	--	--	--	1.8E+01	--	--	--	6.5E+04	--	--	--	6.5E+04	--	
Mercury	0	1.4E+00	7.7E-01	--	--	2.2E+02	8.9E+03	--	--	3.5E-01	1.9E-01	--	--	3.9E+03	2.7E+03	--	--	2.2E+02	2.7E+03	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	8.5E+05	2.7E+07	--	--	4.7E+00	1.5E+02	--	--	8.5E+04	2.7E+06	--	--	8.5E+04	2.7E+06	
Methylene Chloride C	0	--	--	4.6E+01	5.9E+03	--	--	1.7E+06	2.2E+02	--	--	4.6E+00	5.9E+02	--	--	1.7E+05	2.2E+07	--	--	1.7E+05	2.2E+07	
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.5E+02	1.8E+06	--	--	7.5E-03	1.0E+01	--	--	1.0E+02	1.8E+05	--	--	1.0E+02	1.8E+05		
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.5E+03	2.4E+04	1.9E+05	1.1E+07	8.3E+07	3.7E+01	4.4E+00	5.1E+01	4.6E+02	4.1E+05	5.6E+04	1.1E+06	8.3E+06	2.4E+04	5.6E+04	1.1E+06	8.3E+06	
Nitrate (as N)	890	--	--	1.0E-04	--	--	--	1.7E+08	--	--	--	1.8E+03	--	--	--	1.7E+07	--	--	--	1.7E+07	--	
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	3.1E+05	1.3E+07	--	--	1.7E+00	6.9E+01	--	--	3.1E+04	1.3E+06	--	--	3.1E+04	1.3E+06	
N-Nitrosodimethylamine F	0	--	--	6.9E-03	3.0E+01	--	--	2.6E+02	1.1E+06	--	--	6.9E-04	3.0E+00	--	--	2.6E+01	1.1E+05	--	--	2.6E+01	1.1E+05	
N-Nitrosodiphenylamine F	0	--	--	3.3E+01	6.0E+01	--	--	1.3E+06	2.3E+06	--	--	3.3E+00	6.0E+00	--	--	1.3E+05	2.3E+05	--	--	1.3E+05	2.3E+05	
N-Nitrosodi-n-propylamine F	0	--	--	5.0E-02	5.1E+00	--	--	1.9E+03	1.9E+05	--	--	5.0E-03	5.1E-01	--	--	1.9E+02	1.9E+04	--	--	1.9E+02	1.9E+04	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	4.5E+03	7.7E+04	--	--	7.0E+00	1.7E+00	--	--	7.9E+04	2.3E+04	--	--	4.5E+03	2.3E+04	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	1.0E+01	1.5E+02	--	--	1.6E-02	3.3E-03	--	--	1.8E+02	4.5E+01	--	--	1.0E+01	4.5E+01	--	--	
PCB Total F	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.6E+02	2.4E+01	2.4E+01	--	3.5E-03	6.4E-05	6.4E-05	--	4.9E+01	2.4E+00	2.4E+00	--	4.9E+01	2.4E+00	2.4E+00	
Pentachlorophenol C	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	1.9E+03	1.1E+05	1.0E+05	1.1E+06	3.0E+00	2.3E+00	2.7E-01	3.0E+00	3.4E+04	3.2E+04	1.0E+04	1.1E+05	1.9E+03	3.2E+04	1.0E+04	1.1E+05	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.8E+08	1.6E+10	--	--	1.0E+03	8.6E+04	--	--	1.8E+07	1.6E+09	--	--	1.8E+07	1.6E+09	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	1.5E+07	7.3E+07	--	--	8.3E+01	4.0E+02	--	--	1.5E+06	7.3E+06	--	--	1.5E+06	7.3E+06	
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	2.7E+05	--	--	--	1.5E+00	--	--	--	2.7E+04	--	--	--	2.7E+04	--	
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	7.3E+04	7.3E+04	--	--	4.0E-01	4.0E-01	--	--	7.3E+03	7.3E+03	--	--	7.3E+03	7.3E+03	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	9.1E+04	--	--	--	5.0E-01	--	--	--	9.1E+03	--	--	--	9.1E+03	--	
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	5.4E+05	--	--	--	3.0E+00	--	--	--	5.4E+04	--	--	--	5.4E+04	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	3.2E+03	5.8E+04	3.1E+06	7.6E+07	5.0E+00	1.3E+00	1.7E+01	4.2E+02	5.6E+04	1.7E+04	3.1E+05	7.6E+06	3.2E+03	1.7E+04	3.1E+05	7.6E+06
Silver	0	2.3E+00	--	--	--	3.5E+02	--	--	--	5.6E-01	--	--	--	6.3E+03	--	--	--	3.6E+02	--	--	--
Sulfate	7870	--	--	2.5E+05	--	--	--	4.4E+09	--	--	--	3.2E+04	--	--	--	4.4E+08	--	--	4.4E+08	--	
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	6.5E+04	1.5E+06	--	--	1.7E-01	4.0E+00	--	--	6.5E+03	1.5E+05	--	--	6.5E+03	1.5E+05
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	2.6E+05	1.3E+06	--	--	6.9E-01	3.3E+00	--	--	2.6E+04	1.3E+05	--	--	2.6E+04	1.3E+05
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	4.4E+03	8.5E+03	--	--	2.4E-02	4.7E-02	--	--	4.4E+02	8.5E+02	--	--	4.4E+02	8.5E+02
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	9.2E+06	1.1E+08	--	--	5.1E+01	6.0E+02	--	--	9.2E+05	1.1E+07	--	--	9.2E+05	1.1E+07
Total dissolved solids	0	--	--	5.0E+05	--	--	--	9.1E+09	--	--	--	5.0E+04	--	--	--	9.1E+08	--	--	9.1E+08	--	
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.2E+02	2.3E+00	1.1E+02	1.1E+02	1.8E-01	5.0E-05	2.8E-04	2.8E-04	2.0E+03	7.0E-01	1.1E+01	1.1E+01	1.2E+02	7.0E-01	1.1E+01	1.1E+01
Tributyltin	0	4.6E-01	7.2E-02	--	--	7.4E+01	8.4E+02	--	--	1.2E-01	1.8E-02	--	--	1.3E+03	2.5E+02	--	--	7.4E+01	2.5E+02	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	6.3E+05	1.3E+06	--	--	3.5E+00	7.0E+00	--	--	6.3E+04	1.3E+05	--	--	6.3E+04	1.3E+05
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	2.2E+05	6.1E+06	--	--	5.9E-01	1.6E+01	--	--	2.2E+04	6.1E+05	--	--	2.2E+04	6.1E+05
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	9.5E+05	1.1E+07	--	--	2.5E+00	3.0E+01	--	--	9.5E+04	1.1E+06	--	--	9.5E+04	1.1E+06
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	5.3E+05	9.1E+05	--	--	1.4E+00	2.4E+00	--	--	5.3E+04	9.1E+04	--	--	5.3E+04	9.1E+04
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	9.1E+05	--	--	--	5.0E+00	--	--	--	9.1E+04	--	--	9.1E+04	--	
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	9.5E+03	9.1E+05	--	--	2.5E-02	2.4E+00	--	--	9.5E+02	9.1E+04	--	--	9.5E+02	9.1E+04
Zinc	3.68	9.5E+01	9.6E+01	7.4E+03	2.6E+04	1.5E+04	1.1E+06	1.3E+08	4.7E+08	2.6E+01	2.7E+01	7.4E+02	2.6E+03	2.6E+05	3.2E+05	1.3E+07	4.7E+07	1.5E+04	3.2E+05	1.3E+07	4.7E+07

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic = (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.0E+04
Arsenic	1.7E+04
Barium	3.6E+06
Cadmium	1.9E+02
Chromium III	3.0E+04
Chromium VI	1.0E+03
Copper	6.4E+02
Iron	5.4E+05
Lead	5.6E+03
Manganese	6.5E+04
Mercury	9.0E+01
Nickel	9.5E+03
Selenium	1.3E+03
Silver	1.4E+02
Zinc	5.9E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 2:13:29 PM

Facility = VA0000248 - 004  
Chemical = Bis(2-Ethylhexyl) Phthalate  
Chronic averaging period = 4  
WLAa =  
WLAc = 46000  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 35  
Variance = 441  
C.V. = 0.6  
97th percentile daily values = 85.1696  
97th percentile 4 day average = 58.2326  
97th percentile 30 day average= 42.2118  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

## Mixing Zone Predictions for

VA0000248 - 005

Effluent Flow = .45 MGD  
Stream 7Q10 = 559 MGD  
Stream 30Q10 = 646 MGD  
Stream 1Q10 = 449 MGD  
Stream slope = 0.001 ft/ft  
Stream width = 400 ft  
Bottom scale = 3  
Channel scale = 1

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### Mixing Zone Predictions @ 7Q10

Depth = 2.6577 ft  
Length = 67061.83 ft  
Velocity = .8146 ft/sec  
Residence Time = .9528 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

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### Mixing Zone Predictions @ 30Q10

Depth = 2.8998 ft  
Length = 62311.77 ft  
Velocity = .8627 ft/sec  
Residence Time = .836 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

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### Mixing Zone Predictions @ 1Q10

Depth = 2.329 ft  
Length = 74941.09 ft  
Velocity = .7468 ft/sec  
Residence Time = 27.8739 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 3.59% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 005

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	3.59 %	Mean Hardness (as CaCO <sub>3</sub> ) =	122 mg/L
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	22.4 deg C
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	22.4 deg C
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	528 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.6 SU
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7.1 SU
Tier Designation (1 or 2) =	2	30Q5 =	725 MGD			Discharge Flow =	0.45 MGD
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	1.1E+06	1.6E+06	--	--	6.7E+01	9.9E+01	--	--	--	1.1E+05	1.6E+05	--	--	1.1E+05	1.6E+05	
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	9.8E+03	1.5E+04	--	--	6.1E-01	9.3E-01	--	--	--	9.8E+02	1.5E+03	--	--	9.8E+02	1.5E+03	
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	1.7E+03	6.4E+03	--	--	5.1E-02	2.5E-01	--	--	--	1.7E+02	8.4E+02	--	--	1.7E+02	8.4E+02	
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	1.1E+02	--	1.7E+00	1.7E+00	7.5E-01	--	4.9E-05	5.0E-05	7.5E+02	--	1.7E-01	1.7E-01	1.1E+02	--	1.7E-01	1.7E-01		
Ammonia-N (mg/l) (Yearly)	0	3.63E+00	9.86E-01	--	--	1.3E+02	1.4E+03	--	--	9.19E-01	2.46E-01	--	--	9.2E+02	3.5E+02	--	--	1.3E+02	3.5E+02	--	--	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	4.3E+03	4.1E+03	--	--	9.19E-01	4.34E-01	--	--	1.1E+03	1.0E+03	--	--	1.1E+03	1.0E+03	--	--	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	1.3E+07	6.4E+07	--	--	8.3E+02	4.0E+03	--	--	--	1.3E+06	6.4E+06	--	--	1.3E+06	6.4E+06	
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	9.0E+03	1.0E+06	--	--	5.6E-01	6.4E+01	--	--	--	9.0E+02	1.0E+05	--	--	9.0E+02	1.0E+05	
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	1.3E+04	1.9E+05	1.6E+04	--	8.5E+01	3.8E+01	1.3E+00	--	8.5E+04	4.7E+04	1.6E+03	--	1.3E+04	4.7E+04	1.6E+03	--	--	--
Barium	0	--	--	2.0E+03	--	--	--	3.2E+06	--	--	--	2.0E+02	--	--	--	--	3.2E+05	--	--	--	3.2E+05	--	
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	7.4E+04	1.7E+06	--	--	2.2E+00	5.1E+01	--	--	--	7.4E+03	1.7E+05	--	--	7.4E+03	1.7E+05	
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	2.9E+00	6.8E+00	--	--	8.6E-05	2.0E-04	--	--	--	2.9E-01	6.8E-01	--	--	2.9E-01	6.8E-01	
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01	
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01	
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01	
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01	
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	1.0E+03	1.8E+04	--	--	3.0E-02	5.3E-01	--	--	--	1.0E+02	1.8E+03	--	--	1.0E+02	1.8E+03	
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	2.3E+06	1.0E+08	--	--	1.4E+02	6.5E+03	--	--	--	2.3E+05	1.0E+07	--	--	2.3E+05	1.0E+07	
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	4.1E+04	7.4E+04	--	--	1.2E+00	2.2E+00	--	--	--	4.1E+03	7.4E+03	--	--	4.1E+03	7.4E+03	
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	1.5E+05	4.7E+06	--	--	4.3E+00	1.4E+02	--	--	--	1.5E+04	4.7E+05	--	--	1.5E+04	4.7E+05	
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	2.4E+06	3.1E+06	--	--	1.5E+02	1.9E+02	--	--	--	2.4E+05	3.1E+05	--	--	2.4E+05	3.1E+05	
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	1.1E+02	1.2E+03	8.1E+03	--	7.4E-01	2.3E-01	5.0E-01	--	7.4E+02	2.9E+02	8.1E+02	--	1.1E+02	2.9E+02	8.1E+02	--	--	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	7.8E+03	5.4E+04	--	--	2.3E-01	1.6E+00	--	--	--	7.8E+02	5.4E+03	--	--	7.8E+02	5.4E+03	
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	8.8E+01	5.3E+00	2.7E+01	2.7E+01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	6.0E+02	1.3E+00	2.7E+00	2.7E+00	8.8E+01	1.3E+00	2.7E+00	2.7E+00	--	--
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	3.1E+07	2.8E+08	3.9E+08	--	2.2E+05	6.3E+04	3.2E+04	--	2.1E+08	6.9E+07	3.9E+07	--	3.1E+07	6.9E+07	3.9E+07	--	--	--
TRC	0	1.9E+01	1.1E+01	--	--	7.0E+02	1.4E+04	--	--	4.8E+00	2.8E+00	--	--	4.7E+03	3.4E+03	--	--	7.0E+02	3.4E+03	--	--	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	2.1E+05	2.6E+06	--	--	1.3E+01	1.6E+02	--	--	--	2.1E+04	2.6E+05	--	--	2.1E+04	2.6E+05	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>c</sup>	0	--	--	4.0E+00	1.3E+02	--	--	1.4E+04	4.4E+05	--	--	4.0E-01	1.3E+01	--	--	1.4E+03	4.4E+04	--	--	1.4E+03	4.4E+04
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	5.5E+05	1.8E+07	--	--	3.4E+01	1.1E+03	--	--	5.5E+04	1.8E+06	--	--	5.5E+04	1.8E+06
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.6E+06	2.6E+06	--	--	1.0E+02	1.6E+02	--	--	1.6E+05	2.6E+05	--	--	1.6E+05	2.6E+05
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	1.3E+05	2.4E+05	--	--	8.1E+00	1.5E+01	--	--	1.3E+04	2.4E+04	--	--	1.3E+04	2.4E+04
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	3.1E+00	5.1E+01	--	--	2.1E-02	1.0E-02	--	--	2.1E+01	1.3E+01	--	--	3.1E+00	1.3E+01	--	--
Chromium III	0	4.7E+02	6.0E+01	--	--	1.7E+04	7.5E+04	--	--	1.2E+02	1.5E+01	--	--	1.2E+05	1.9E+04	--	--	1.7E+04	1.9E+04	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	5.9E+02	1.4E+04	--	--	4.0E+00	2.8E+00	--	--	4.0E+03	3.4E+03	--	--	5.9E+02	3.4E+03	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	1.6E+05	--	--	--	1.0E+01	--	--	--	1.6E+04	--	--	--	1.6E+04	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	1.3E+01	6.1E+01	--	--	3.8E-04	1.8E-03	--	--	1.3E+00	6.1E+00	--	--	1.3E+00	6.1E+00
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	3.7E+02	8.2E+03	2.1E+06	--	3.1E+00	2.3E+00	1.3E+02	--	2.5E+03	2.1E+03	2.1E+05	--	3.7E+02	2.1E+03	2.1E+05	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	8.1E+02	6.5E+03	2.3E+05	2.6E+07	5.5E+00	1.3E+00	1.4E+01	1.6E+03	5.5E+03	1.6E+03	2.3E+04	2.6E+06	8.1E+02	1.6E+03	2.3E+04	2.6E+06
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	1.0E+01	1.0E+01	--	--	3.1E-04	3.1E-04	--	--	1.0E+00	1.0E+00	--	--	1.0E+00	1.0E+00
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	7.4E+00	7.4E+00	--	--	2.2E-04	2.2E-04	--	--	7.4E-01	7.4E-01	--	--	7.4E-01	7.4E-01
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	4.1E+01	1.2E+00	7.4E+00	7.4E+00	2.8E-01	2.5E-04	2.2E-04	2.2E-04	2.7E+02	3.1E-01	7.4E-01	7.4E-01	4.1E+01	3.1E-01	7.4E-01	7.4E-01
Demeton	0	--	--	1.0E-01	--	--	--	1.2E+02	--	--	--	2.5E-02	--	--	--	3.1E+01	--	--	--	3.1E+01	--
Diazinon	0	1.7E-01	1.7E-01	--	--	6.3E+00	2.1E+02	--	--	4.3E-02	4.3E-02	--	--	4.2E+01	5.3E+01	--	--	6.3E+00	5.3E+01	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	6.8E+05	2.1E+06	--	--	4.2E+01	1.3E+02	--	--	6.8E+04	2.1E+05	--	--	6.8E+04	2.1E+05
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	5.2E+05	1.5E+06	--	--	3.2E+01	9.6E+01	--	--	5.2E+04	1.5E+05	--	--	5.2E+04	1.5E+05
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	1.0E+05	3.1E+05	--	--	6.3E+00	1.9E+01	--	--	1.0E+04	3.1E+04	--	--	1.0E+04	3.1E+04
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	2.1E-01	2.8E-01	--	--	7.1E+02	9.5E+02	--	--	2.1E-02	2.8E-02	--	--	7.1E+01	9.5E+01	--	--	7.1E+01	9.5E+01
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	1.9E+04	5.7E+05	--	--	5.5E-01	1.7E+01	--	--	1.9E+03	5.7E+04	--	--	1.9E+03	5.7E+04
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	1.3E+04	1.3E+06	--	--	3.8E-01	3.7E+01	--	--	1.3E+03	1.3E+05	--	--	1.3E+03	1.3E+05
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	5.3E+05	1.1E+07	--	--	3.3E+01	7.1E+02	--	--	5.3E+04	1.1E+06	--	--	5.3E+04	1.1E+06
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	2.3E+05	1.6E+07	--	--	1.4E+01	1.0E+03	--	--	2.3E+04	1.6E+06	--	--	2.3E+04	1.6E+06
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.2E+05	4.7E+05	--	--	7.7E+00	2.9E+01	--	--	1.2E+04	4.7E+04	--	--	1.2E+04	4.7E+04
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.6E+05	--	--	--	1.0E+01	--	--	--	1.6E+04	--	--	--	1.6E+04	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	5.0E+00	1.5E+02	--	--	1.7E+04	5.1E+05	--	--	5.0E-01	1.5E+01	--	--	1.7E+03	5.1E+04	--	--	1.7E+03	5.1E+04
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	1.1E+04	7.1E+05	--	--	3.4E-01	2.1E+01	--	--	1.1E+03	7.1E+04	--	--	1.1E+03	7.1E+04
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	8.8E+00	7.0E+01	1.8E+00	1.8E+00	6.0E-02	1.4E-02	5.2E-05	5.4E-05	6.0E+01	1.7E+01	1.8E-01	1.8E-01	8.8E+00	1.7E+01	1.8E-01	1.8E-01
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	2.7E+07	7.1E+07	--	--	1.7E+03	4.4E+03	--	--	2.7E+06	7.1E+06	--	--	2.7E+06	7.1E+06
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	6.1E+05	1.4E+06	--	--	3.8E+01	8.5E+01	--	--	6.1E+04	1.4E+05	--	--	6.1E+04	1.4E+05
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	4.4E+08	1.8E+09	--	--	2.7E+04	1.1E+05	--	--	4.4E+07	1.8E+08	--	--	4.4E+07	1.8E+08
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	3.2E+06	7.3E+06	--	--	2.0E+02	4.5E+02	--	--	3.2E+05	7.3E+05	--	--	3.2E+05	7.3E+05
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	1.1E+05	8.5E+06	--	--	6.9E+00	5.3E+02	--	--	1.1E+04	8.5E+05	--	--	1.1E+04	8.5E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	2.1E+04	4.5E+05	--	--	1.3E+00	2.8E+01	--	--	2.1E+03	4.5E+04	--	--	2.1E+03	4.5E+04
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	3.7E+03	1.1E+05	--	--	1.1E-01	3.4E+00	--	--	3.7E+02	1.1E+04	--	--	3.7E+02	1.1E+04
Dioxin, 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	8.1E-05	8.2E-05	--	--	5.0E-09	5.1E-09	--	--	8.1E-06	8.2E-06	--	--	8.1E-06	8.2E-06
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	3.6E-01	2.0E+00	--	--	1.2E+03	6.8E+03	--	--	3.6E-02	2.0E-01	--	--	1.2E+02	6.8E+02	--	--	1.2E+02	6.8E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	8.1E+00	7.0E+01	1.0E+05	1.4E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	5.5E+01	1.7E+01	1.0E+04	1.4E+04	8.1E+00	1.7E+01	1.0E+04	1.4E+04
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	8.1E+00	7.0E+01	1.0E+05	1.4E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	5.5E+01	1.7E+01	1.0E+04	1.4E+04	8.1E+00	1.7E+01	1.0E+04	1.4E+04
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	8.1E+00	7.0E+01	--	--	5.5E-02	1.4E-02	--	--	5.5E+01	1.7E+01	--	--	8.1E+00	1.7E+01	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	1.0E+05	1.4E+05	--	--	6.2E+00	8.9E+00	--	--	1.0E+04	1.4E+04	--	--	1.0E+04	1.4E+04
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	3.2E+00	4.5E+01	9.5E+01	9.7E+01	2.2E-02	9.0E-03	5.9E-03	6.0E-03	2.1E+01	1.1E+01	9.5E+00	9.7E+00	3.2E+00	1.1E+01	9.5E+00	9.7E+00
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	4.7E+02	4.8E+02	--	--	2.9E-02	3.0E-02	--	--	4.7E+01	4.8E+01	--	--	4.7E+01	4.8E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	8.5E+05	3.4E+06	--	--	5.3E+01	2.1E+02	--	--	8.5E+04	3.4E+05	--	--	8.5E+04	3.4E+05
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	2.1E+05	2.3E+05	--	--	1.3E+01	1.4E+01	--	--	2.1E+04	2.3E+04	--	--	2.1E+04	2.3E+04
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.8E+06	8.5E+06	--	--	1.1E+02	5.3E+02	--	--	1.8E+05	8.5E+05	--	--	1.8E+05	8.5E+05
Foaming Agents	0	--	--	5.0E+02	--	--	--	8.1E+05	--	--	--	5.0E+01	--	--	--	8.1E+04	--	--	--	8.1E+04	--
Gulthion	0	--	1.0E-02	--	--	--	1.2E+01	--	--	--	2.5E-03	--	--	--	3.1E+00	--	--	--	3.1E+00	--	--
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.9E+01	4.7E+00	2.7E+00	2.7E+00	1.3E-01	9.5E-04	7.9E-05	7.9E-05	1.3E+02	1.2E+00	2.7E-01	2.7E-01	1.9E+01	1.2E+00	2.7E-01	2.7E-01
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.9E+01	4.7E+00	1.3E+00	1.3E+00	1.3E-01	9.5E-04	3.9E-05	3.9E-05	1.3E+02	1.2E+00	1.3E-01	1.3E-01	1.9E+01	1.2E+00	1.3E-01	1.3E-01
Hexachlorobenzene <sup>e</sup>	0	--	--	2.8E-03	2.9E-03	--	--	9.5E+00	9.8E+00	--	--	2.8E-04	2.9E-04	--	--	9.5E-01	9.8E-01	--	--	9.5E-01	9.8E-01
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	1.5E+04	6.1E+05	--	--	4.4E-01	1.8E+01	--	--	1.5E+03	6.1E+04	--	--	1.5E+03	6.1E+04
Hexachlorocyclohexane	0	--	--	2.6E-02	4.9E-02	--	--	8.8E+01	1.7E+02	--	--	2.6E-03	4.9E-03	--	--	8.8E+00	1.7E+01	--	--	8.8E+00	1.7E+01
Hexachlorocyclohexane Beta	0	--	--	9.1E-02	1.7E-01	--	--	3.1E+02	5.7E+02	--	--	9.1E-03	1.7E-02	--	--	3.1E+01	5.7E+01	--	--	3.1E+01	5.7E+01
BHC <sup>c</sup>	0	--	--	9.8E-01	1.8E+00	3.5E+01	--	3.3E+03	6.1E+03	2.4E-01	--	9.8E-02	1.8E-01	2.4E+02	--	3.3E+02	6.1E+02	3.5E+01	--	3.3E+02	6.1E+02
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	6.4E+04	1.8E+06	--	--	4.0E+00	1.1E+02	--	--	6.4E+03	1.8E+05	--	--	6.4E+03	1.8E+05
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	4.7E+04	1.1E+05	--	--	1.4E+00	3.3E+00	--	--	4.7E+03	1.1E+04	--	--	4.7E+03	1.1E+04
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.5E+03	--	--	--	6.0E-01	--	--	--	6.2E+02	--	--	--	6.2E+02	--	--
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.3E+02	6.1E+02	--	--	3.8E-03	1.8E-02	--	--	1.3E+01	6.1E+01	--	--	1.3E+01	6.1E+01
Iron	0	--	--	3.0E+02	--	--	--	4.8E+05	--	--	--	3.0E+01	--	--	--	4.8E+04	--	--	--	4.8E+04	--
Isophorone <sup>f</sup>	0	--	--	3.5E+02	9.6E+03	--	--	1.2E+06	3.2E+07	--	--	3.5E+01	9.6E+02	--	--	1.2E+05	3.2E+06	--	--	1.2E+05	3.2E+06
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Lead	0	8.8E+01	9.9E+00	1.5E+01	--	3.3E+03	1.2E+04	2.4E+04	--	2.2E+01	2.5E+00	1.5E+00	--	2.2E+04	3.1E+03	2.4E+03	--	3.3E+03	3.1E+03	2.4E+03	--
Malathion	0	--	1.0E-01	--	--	--	1.2E+02	--	--	--	2.5E-02	--	--	--	3.1E+01	--	--	--	3.1E+01	--	--
Manganese	14.32	--	--	5.0E+01	--	--	--	5.8E+04	--	--	--	1.8E+01	--	--	--	5.8E+03	--	--	--	5.8E+03	--
Mercury	0	1.4E+00	7.7E-01	--	--	5.2E+01	9.6E+02	--	--	3.5E-01	1.9E-01	--	--	3.5E+02	2.4E+02	--	--	5.2E+01	2.4E+02	--	--
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	7.6E+04	2.4E+06	--	--	4.7E+00	1.5E+02	--	--	7.6E+03	2.4E+05	--	--	7.6E+03	2.4E+05
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	1.5E+05	2.0E+07	--	--	4.6E+00	5.9E+02	--	--	1.6E+04	2.0E+06	--	--	1.6E+04	2.0E+06
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.7E+01	1.6E+05	--	--	7.5E-03	1.0E+01	--	--	9.3E+00	1.6E+04	--	--	9.3E+00	1.6E+04	
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	5.5E+03	2.0E+04	9.8E+05	7.4E+06	3.7E+01	4.4E+00	6.1E+01	4.6E+02	3.7E+04	5.0E+03	9.8E+04	7.4E+05	5.5E+03	5.0E+03	9.8E+04	7.4E+05
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	1.5E+07	--	--	--	1.8E+03	--	--	--	1.5E+06	--	--	--	1.5E+06	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	2.7E+04	1.1E+06	--	--	1.7E+00	6.9E+01	--	--	2.7E+03	1.1E+05	--	--	2.7E+03	1.1E+05
N-Nitrosodimethylamine <sup>f</sup>	0	--	--	6.9E-03	3.0E+01	--	--	2.3E+01	1.0E+05	--	--	6.9E-04	3.0E+00	--	--	2.3E+00	1.0E+04	--	--	2.3E+00	1.0E+04
N-Nitrosodiphenylamine <sup>f</sup>	0	--	--	3.3E+01	6.0E+01	--	--	1.1E+05	2.0E+05	--	--	3.3E+00	6.0E+00	--	--	1.1E+04	2.0E+04	--	--	1.1E+04	2.0E+04
N-Nitrosodi-n-propylamine <sup>f</sup>	0	--	--	5.0E-02	5.1E+00	--	--	1.7E+02	1.7E+04	--	--	5.0E-03	5.1E-01	--	--	1.7E+01	1.7E+03	--	--	1.7E+01	1.7E+03
Nonyphenol	0	2.8E+01	6.6E+00	--	--	1.0E+03	8.2E+03	--	--	7.0E+00	1.7E+00	--	--	7.0E+03	2.1E+03	--	--	1.0E+03	2.1E+03	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	2.4E+00	1.6E+01	--	--	1.6E-02	3.3E-03	--	--	1.6E+01	4.0E+00	--	--	2.4E+00	4.0E+00	--	--
PCB Total <sup>f</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.7E+01	2.2E+00	2.2E+00	--	3.5E-03	6.4E-05	6.4E-05	--	4.4E+00	2.2E-01	2.2E-01	--	4.4E+00	2.2E-01	2.2E-01
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	4.4E+02	1.1E+04	9.1E+03	1.0E+05	3.0E+00	2.3E+00	2.7E-01	3.0E+00	3.0E+03	2.9E+03	9.1E+02	1.0E+04	4.4E+02	2.9E+03	9.1E+02	1.0E+04
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.6E+07	1.4E+09	--	--	1.0E+03	8.6E+04	--	--	1.6E+06	1.4E+08	--	--	1.6E+06	1.4E+08
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	1.3E+06	6.4E+06	--	--	8.3E+01	4.0E+02	--	--	1.3E+05	6.4E+05	--	--	1.3E+05	6.4E+05
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	2.4E+04	--	--	--	1.5E+00	--	--	--	2.4E+03	--	--	--	2.4E+03	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	6.4E+03	6.4E+03	--	--	4.0E-01	4.0E-01	--	--	6.4E+02	6.4E+02	--	--	6.4E+02	6.4E+02
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	8.1E+03	--	--	--	5.0E-01	--	--	--	8.1E+02	--	--	--	8.1E+02	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	4.8E+04	--	--	--	3.0E+00	--	--	--	4.8E+03	--	--	--	4.8E+03	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	7.4E+02	6.2E+03	2.7E+05	6.8E+06	5.0E+00	1.3E+00	1.7E+01	4.2E+02	5.0E+03	1.6E+03	2.7E+04	6.8E+05	7.4E+02	1.6E+03	2.7E+04	6.8E+05	
Silver	0	2.3E+00	--	--	--	8.5E+01	--	--	--	5.6E-01	--	--	--	5.6E+02	--	--	--	8.5E+01	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	3.9E+08	--	--	--	3.2E+04	--	--	--	3.9E+07	--	--	3.9E+07	--	--	
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	5.7E+03	1.4E+05	--	--	1.7E-01	4.0E+00	--	--	5.7E+02	1.4E+04	--	--	5.7E+02	1.4E+04	
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	2.3E+04	1.1E+05	--	--	6.9E-01	3.3E+00	--	--	2.3E+03	1.1E+04	--	--	2.3E+03	1.1E+04	
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	3.9E+02	7.6E+02	--	--	2.4E-02	4.7E-02	--	--	3.9E+01	7.6E+01	--	--	3.9E+01	7.6E+01	
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	8.2E+05	9.7E+06	--	--	5.1E+01	6.0E+02	--	--	8.2E+04	9.7E+05	--	--	8.2E+04	9.7E+05	
Total dissolved solids	0	--	--	5.0E+05	--	--	--	8.1E+08	--	--	--	5.0E+04	--	--	--	8.1E+07	--	--	8.1E+07	--	--	
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	2.7E+01	2.5E-01	9.5E+00	9.5E+00	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.8E+02	6.2E-02	9.5E-01	9.5E-01	2.7E+01	6.2E-02	9.5E-01	9.5E-01	
Tributyltin	0	4.6E-01	7.2E-02	--	--	1.7E+01	9.0E+01	--	--	1.2E-01	1.8E-02	--	--	1.1E+02	2.2E+01	--	--	1.7E+01	2.2E+01	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	5.6E+04	1.1E+05	--	--	3.5E+00	7.0E+00	--	--	5.6E+03	1.1E+04	--	--	5.6E+03	1.1E+04	
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	2.0E+04	5.4E+05	--	--	5.9E-01	1.6E+01	--	--	2.0E+03	5.4E+04	--	--	2.0E+03	5.4E+04	
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	8.4E+04	1.0E+06	--	--	2.5E+00	3.0E+01	--	--	8.4E+03	1.0E+05	--	--	8.4E+03	1.0E+05	
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	4.7E+04	8.1E+04	--	--	1.4E+00	2.4E+00	--	--	4.7E+03	8.1E+03	--	--	4.7E+03	8.1E+03	
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	8.1E+04	--	--	--	5.0E+00	--	--	--	8.1E+03	--	--	8.1E+03	--	--	
Vinyl Chloride <sup>c</sup>	0	--	--	--	2.5E-01	2.4E+01	--	--	8.4E+02	8.1E+04	--	--	2.5E-02	2.4E+00	--	--	8.4E+01	8.1E+03	--	--	8.4E+01	8.1E+03
Zinc	3.68	9.6E+01	9.6E+01	7.4E+03	2.6E+04	3.4E+03	1.1E+05	1.2E+07	4.2E+07	2.7E+01	2.7E+01	7.4E+02	2.6E+03	2.3E+04	2.9E+04	1.2E+06	4.2E+06	3.4E+03	2.9E+04	1.2E+06	4.2E+06	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	9.0E+02
Arsenic	1.6E+03
Barium	3.2E+05
Cadmium	4.4E+01
Chromium III	6.9E+03
Chromium VI	2.4E+02
Copper	1.5E+02
Iron	4.8E+04
Lead	1.3E+03
Manganese	5.8E+03
Mercury	2.1E+01
Nickel	2.2E+03
Selenium	2.9E+02
Silver	3.4E+01
Zinc	1.4E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 2:08:16 PM

Facility = VA0000248 - 005  
Chemical = Iron, Total  
Chronic averaging period = 4  
WL<sub>Aa</sub> =  
WL<sub>Ac</sub> = 48000  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 102  
Variance = 3745.44  
C.V. = 0.6  
97th percentile daily values = 248.208  
97th percentile 4 day average = 169.706  
97th percentile 30 day average= 123.017  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

102

## Mixing Zone Predictions for

VA0000248 - 006

Effluent Flow = 13.7 MGD

Stream 7Q10 = 559 MGD

Stream 30Q10 = 646 MGD

Stream 1Q10 = 449 MGD

Stream slope = 0.001 ft/ft

Stream width = 550 ft

Bottom scale = 3

Channel scale = 1

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### Mixing Zone Predictions @ 7Q10

Depth = 2.2219 ft

Length = 147702.59 ft

Velocity = .7255 ft/sec

Residence Time = 2.3565 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 84.87% of the 7Q10 is used.

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### Mixing Zone Predictions @ 30Q10

Depth = 2.4193 ft

Length = 137520.78 ft

Velocity = .7675 ft/sec

Residence Time = 2.074 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 96.43% of the 30Q10 is used.

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### Mixing Zone Predictions @ 1Q10

Depth = 1.9542 ft

Length = 164482.85 ft

Velocity = .6664 ft/sec

Residence Time = 68.5631 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.46% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 006

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	1.46 %	Mean Hardness (as CaCO <sub>3</sub> ) =	56 mg/L
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	84.87 %	90% Temp (Annual) =	25.3 deg C
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =	96.43 %	90% Temp (Wet season) =	25.3 deg C
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	528 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.2 SU
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6.8 SU
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD			Discharge Flow =	13.7 MGD
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	3.6E+04	5.3E+04	--	--	5.7E+01	9.9E+01	--	--	3.6E+03	5.3E+03	--	--	3.6E+03	5.3E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	3.3E+02	5.0E+02	--	--	6.1E-01	9.3E-01	--	--	3.3E+01	5.0E+01	--	--	3.3E+01	5.0E+01
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	5.7E+01	2.8E+02	--	--	5.1E-02	2.5E-01	--	--	5.7E+00	2.8E+01	--	--	5.7E+00	2.8E+01
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	4.4E+00	--	5.5E-02	5.6E-02	7.5E-01	--	4.9E-05	5.0E-05	2.5E+01	--	5.5E-03	5.6E-03	4.4E+00	--	5.5E-03	5.6E-03
Ammonia-N (mg/l) (Yearly)	0	3.78E+00	9.84E-01	--	--	5.6E+00	4.5E+01	--	--	9.21E-01	2.46E-01	--	--	3.1E+01	1.2E+01	--	--	5.6E+00	1.2E+01	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	1.5E+02	1.4E+02	--	--	9.21E-01	4.34E-01	--	--	3.6E+01	3.4E+01	--	--	3.6E+01	3.4E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	4.5E+05	2.2E+06	--	--	8.3E+02	4.0E+03	--	--	4.5E+04	2.2E+05	--	--	4.5E+04	2.2E+05
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	3.0E+02	3.5E+04	--	--	5.6E-01	6.4E+01	--	--	3.0E+01	3.5E+03	--	--	3.0E+01	3.5E+03
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	5.0E+02	5.3E+03	5.2E+02	--	8.5E+01	3.8E+01	1.3E+00	--	2.9E+03	1.6E+03	5.2E+01	--	5.0E+02	1.6E+03	5.2E+01	--
Barium	0	--	--	2.0E+03	--	--	--	1.1E+05	--	--	--	2.0E+02	--	--	--	1.1E+04	--	--	--	1.1E+04	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	2.5E+03	5.7E+04	--	--	2.2E+00	5.1E+01	--	--	2.5E+02	5.7E+03	--	--	2.5E+02	5.7E+03
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	9.6E-02	2.2E-01	--	--	8.6E-05	2.0E-04	--	--	9.6E-03	2.2E-02	--	--	9.6E-03	2.2E-02
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	3.4E+01	5.9E+02	--	--	3.0E-02	5.3E-01	--	--	3.4E+00	5.9E+01	--	--	3.4E+00	5.9E+01
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	7.6E+04	3.5E+06	--	--	1.4E+02	6.5E+03	--	--	7.6E+03	3.5E+05	--	--	7.6E+03	3.5E+05
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	1.3E+03	2.5E+03	--	--	1.2E+00	2.2E+00	--	--	1.3E+02	2.5E+02	--	--	1.3E+02	2.5E+02
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	4.8E+03	1.6E+05	--	--	4.3E+00	1.4E+02	--	--	4.8E+02	1.6E+04	--	--	4.8E+02	1.6E+04
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	8.1E+04	1.0E+05	--	--	1.5E+02	1.9E+02	--	--	8.1E+03	1.0E+04	--	--	8.1E+03	1.0E+04
Cadmium	0	2.3E+00	9.3E-01	5.0E+00	--	3.5E+00	3.3E+01	2.7E+02	--	7.3E-01	2.3E-01	5.0E-01	--	2.5E+01	9.7E+00	2.7E+01	--	3.5E+00	9.7E+00	2.7E+01	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	2.6E+02	1.8E+03	--	--	2.3E-01	1.6E+00	--	--	2.6E+01	1.8E+02	--	--	2.6E+01	1.8E+02
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	3.5E+00	1.5E-01	9.0E-01	9.1E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	2.0E+01	4.5E-02	9.0E-02	9.1E-02	3.5E+00	4.5E-02	9.0E-02	9.1E-02
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	1.3E+06	7.9E+06	1.3E+07	--	2.2E+05	6.3E+04	3.2E+04	--	7.2E+05	2.3E+06	1.3E+06	--	1.3E+06	2.3E+06	1.3E+06	--
TRC	0	1.9E+01	1.1E+01	--	--	2.8E+01	3.9E+02	--	--	4.8E+00	2.8E+00	--	--	1.6E+02	1.1E+02	--	--	2.8E+01	1.1E+02	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	7.0E+03	8.6E+04	--	--	1.3E+01	1.6E+02	--	--	7.0E+02	8.6E+03	--	--	7.0E+02	8.6E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Chlorodibromomethane	0	--	--	4.0E+00	1.3E+02	--	--	4.5E+02	1.5E+04	--	--	4.0E-01	1.3E+01	--	--	4.5E+01	1.5E+03	--	--	4.5E+01	1.5E+03	
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.8E+04	5.9E+05	--	--	3.4E+01	1.1E+03	--	--	1.8E+03	5.9E+04	--	--	1.8E+03	5.9E+04	
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	5.4E+04	8.6E+04	--	--	1.0E+02	1.6E+02	--	--	5.4E+03	8.6E+03	--	--	5.4E+03	8.6E+03	
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	4.4E+03	8.1E+03	--	--	8.1E+00	1.5E+01	--	--	4.4E+02	8.1E+02	--	--	4.4E+02	8.1E+02	
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.2E-01	1.5E+00	--	--	2.1E-02	1.0E-02	--	--	7.0E-01	4.3E-01	--	--	1.2E-01	4.3E-01	--	--	
Chromium III	0	3.9E+02	6.0E+01	--	--	5.8E+02	2.1E+03	--	--	1.2E+02	1.5E+01	--	--	3.9E+03	6.3E+02	--	--	5.8E+02	6.3E+02	--	--	
Chromium VI	0	1.6E+01	1.1E+01	--	--	2.4E+01	3.9E+02	--	--	4.0E+00	2.8E+00	--	--	1.4E+02	1.1E+02	--	--	2.4E+01	1.1E+02	--	--	
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	5.4E+03	--	--	--	1.0E+01	--	--	--	5.4E+02	--	--	--	5.4E+02	--	
Chrysene	c	0	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	3.8E-04	1.8E-03	--	--	4.3E-02	2.0E-01	--	--	4.3E-02	2.0E-01
Copper	0.65	8.7E+00	7.2E+00	1.3E+03	--	1.3E+01	2.3E+02	7.0E+04	--	3.1E+00	2.3E+00	1.3E+02	--	8.4E+01	6.9E+01	7.0E+03	--	1.3E+01	6.9E+01	7.0E+03	--	
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	3.3E+01	1.9E+02	7.6E+03	8.6E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	1.9E+02	5.4E+01	7.6E+02	8.6E+04	3.3E+01	5.4E+01	7.6E+02	8.6E+04	
DDD	c	0	--	--	3.1E-03	3.1E-03	--	--	3.5E-01	3.5E-01	--	--	3.1E-04	3.1E-04	--	--	3.5E-02	3.5E-02	--	--	3.5E-02	3.5E-02
DDE	c	0	--	--	2.2E-03	2.2E-03	--	--	2.5E-01	2.5E-01	--	--	2.2E-04	2.2E-04	--	--	2.5E-02	2.5E-02	--	--	2.5E-02	2.5E-02
DDT	c	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.6E+00	3.6E-02	2.5E-01	2.5E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	9.3E+00	1.0E-02	2.5E-02	2.5E-02	1.6E+00	1.0E-02	2.5E-02	2.5E-02
Demeton	0	--	--	1.0E-01	--	--	--	3.6E+00	--	--	--	2.5E-02	--	--	--	1.0E+00	--	--	--	1.0E+00	--	
Diazinon	0	1.7E-01	1.7E-01	--	--	2.5E-01	6.1E+00	--	--	4.3E-02	4.3E-02	--	--	1.4E+00	1.8E+00	--	--	2.5E-01	1.8E+00	--	--	
Dibenz(a,h)anthracene	c	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	2.3E+04	7.0E+04	--	--	4.2E+01	1.3E+02	--	--	2.3E+03	7.0E+03	--	--	2.3E+03	7.0E+03	
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.7E+04	5.2E+04	--	--	3.2E+01	9.6E+01	--	--	1.7E+03	5.2E+03	--	--	1.7E+03	5.2E+03	
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	3.4E+03	1.0E+04	--	--	6.3E+00	1.9E+01	--	--	3.4E+02	1.0E+03	--	--	3.4E+02	1.0E+03	
3,3-Dichlorobenzidine	c	0	--	--	2.1E-01	2.8E-01	--	--	2.4E+01	3.1E+01	--	--	2.1E-02	2.8E-02	--	--	2.4E+00	3.1E+00	--	--	2.4E+00	3.1E+00
Dichlorobromomethane	c	0	--	--	5.5E+00	1.7E+02	--	--	6.2E+02	1.9E+04	--	--	5.5E-01	1.7E+01	--	--	6.2E+01	1.9E+03	--	--	6.2E+01	1.9E+03
1,2-Dichloroethane	c	0	--	--	3.8E+00	3.7E+02	--	--	4.3E+02	4.1E+04	--	--	3.8E-01	3.7E+01	--	--	4.3E+01	4.1E+03	--	--	4.3E+01	4.1E+03
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.8E+04	3.8E+05	--	--	3.3E+01	7.1E+02	--	--	1.8E+03	3.8E+04	--	--	1.8E+03	3.8E+04	
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	7.6E+03	5.4E+05	--	--	1.4E+01	1.0E+03	--	--	7.6E+02	5.4E+04	--	--	7.6E+02	5.4E+04	
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	4.2E+03	1.6E+04	--	--	7.7E+00	2.9E+01	--	--	4.2E+02	1.6E+03	--	--	4.2E+02	1.6E+03	
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	5.4E+03	--	--	--	1.0E+01	--	--	--	5.4E+02	--	--	--	5.4E+02	--	
1,2-Dichloropropane	c	0	--	--	5.0E+00	1.5E+02	--	--	5.6E+02	1.7E+04	--	--	5.0E-01	1.5E+01	--	--	5.6E+01	1.7E+03	--	--	5.6E+01	1.7E+03
1,3-Dichloropropene	c	0	--	--	3.4E+00	2.1E+02	--	--	3.8E+02	2.4E+04	--	--	3.4E-01	2.1E+01	--	--	3.8E+01	2.4E+03	--	--	3.8E+01	2.4E+03
Dieldrin	c	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	3.5E-01	2.0E+00	5.8E-02	6.0E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	2.0E+00	5.9E-01	5.8E-03	6.0E-03	3.5E-01	5.9E-01	5.8E-03	6.0E-03
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	9.2E+05	2.4E+06	--	--	1.7E+03	4.4E+03	--	--	9.2E+04	2.4E+05	--	--	9.2E+04	2.4E+05	
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	2.1E+04	4.6E+04	--	--	3.8E+01	6.5E+01	--	--	2.1E+03	4.6E+03	--	--	2.1E+03	4.6E+03	
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.5E+07	5.9E+07	--	--	2.7E+04	1.1E+05	--	--	1.5E+06	5.9E+06	--	--	1.5E+06	5.9E+06	
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	1.1E+05	2.4E+05	--	--	2.0E+02	4.5E+02	--	--	1.1E+04	2.4E+04	--	--	1.1E+04	2.4E+04	
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	3.7E+03	2.9E+05	--	--	6.9E+00	5.3E+02	--	--	3.7E+02	2.9E+04	--	--	3.7E+02	2.9E+04	
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	7.0E+02	1.5E+04	--	--	1.3E+00	2.8E+01	--	--	7.0E+01	1.5E+03	--	--	7.0E+01	1.5E+03	
2,4-Dinitrotoluene	c	0	--	--	1.1E+00	3.4E+01	--	--	1.2E+02	3.8E+03	--	--	1.1E-01	3.4E+00	--	--	1.2E+01	3.8E+02	--	--	1.2E+01	3.8E+02
Dioxin 2,3,7,8-tetrachlorobenzene-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	2.7E-06	2.8E-06	--	--	5.0E-09	5.1E-09	--	--	2.7E-07	2.8E-07	--	--	2.7E-07	2.8E-07	
1,2-Diphenylhydrazine	c	0	--	--	3.6E-01	2.0E+00	--	--	4.0E+01	2.2E+02	--	--	3.6E-02	2.0E-01	--	--	4.0E+00	2.2E+01	--	--	4.0E+00	2.2E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.3E-01	2.0E+00	3.3E+03	4.8E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.9E+00	5.9E-01	3.3E+02	4.8E+02	3.3E-01	5.9E-01	3.3E+02	4.8E+02	
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.3E-01	2.0E+00	3.3E+03	4.8E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.9E+00	5.9E-01	3.3E+02	4.8E+02	3.3E-01	5.9E-01	3.3E+02	4.8E+02	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	3.3E-01	2.0E+00	--	--	5.5E-02	1.4E-02	--	--	1.9E+00	5.9E-01	--	--	3.3E-01	5.9E-01	--	--	
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	3.3E+03	4.8E+03	--	--	6.2E+00	8.9E+00	--	--	3.3E+02	4.8E+02	--	--	3.3E+02	4.8E+02	
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.3E-01	1.3E+00	3.2E+00	3.2E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	7.3E-01	3.8E-01	3.2E-01	3.2E-01	1.3E-01	3.8E-01	3.2E-01	3.2E-01	
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.6E+01	1.6E+01	--	--	2.9E-02	3.0E-02	--	--	1.6E+00	1.6E+00	--	--	1.6E+00	1.6E+00	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	2.9E+04	1.1E+05	--	--	5.3E+01	2.1E+02	--	--	2.9E+03	1.1E+04	--	--	2.9E+03	1.1E+04	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	7.0E+03	7.6E+03	--	--	1.3E+01	1.4E+01	--	--	7.0E+02	7.6E+02	--	--	7.0E+02	7.6E+02	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	5.9E+04	2.9E+05	--	--	1.1E+02	5.3E+02	--	--	5.9E+03	2.9E+04	--	--	5.9E+03	2.9E+04	
Foaming Agents	0	--	--	5.0E+02	--	--	--	2.7E+04	--	--	--	5.0E+01	--	--	--	2.7E+03	--	--	--	2.7E+03	--	
Guthion	0	--	1.0E-02	--	--	--	3.6E-01	--	--	--	2.5E-03	--	--	--	1.0E-01	--	--	--	1.0E-01	--	--	
Heptachlor C	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	7.7E-01	1.4E-01	8.8E-02	8.8E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	4.4E+00	4.0E-02	8.8E-03	8.8E-03	7.7E-01	4.0E-02	8.8E-03	8.8E-03	
Heptachlor Epoxide F	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	7.7E-01	1.4E-01	4.4E-02	4.4E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	4.4E+00	4.0E-02	4.4E-03	4.4E-03	7.7E-01	4.0E-02	4.4E-03	4.4E-03	
Hexachlorobenzene F	0	--	--	2.6E-03	2.9E-03	--	--	3.1E-01	3.2E-01	--	--	2.8E-04	2.9E-04	--	--	3.1E-02	3.2E-02	--	--	3.1E-02	3.2E-02	
Hexachlorobutadiene F	0	--	--	4.4E+00	1.8E+02	--	--	4.9E+02	2.0E+04	--	--	4.4E-01	1.8E+01	--	--	4.9E+01	2.0E+03	--	--	4.9E+01	2.0E+03	
Hexachlorocyclohexane																						
Alpha-BHC C	0	--	--	2.6E-02	4.9E-02	--	--	2.9E+00	5.5E+00	--	--	2.6E-03	4.9E-03	--	--	2.9E-01	5.5E-01	--	--	2.9E-01	5.5E-01	
Hexachlorocyclohexane Beta																						
BHC C	0	--	--	9.1E-02	1.7E-01	--	--	1.0E+01	1.9E+01	--	--	9.1E-03	1.7E-02	--	--	1.0E+00	1.9E+00	--	--	1.0E+00	1.9E+00	
Hexachlorocyclohexane																						
Gamma-BHC (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.4E+00	--	1.1E+02	2.0E+02	2.4E-01	--	9.8E-02	1.8E-01	8.0E+00	--	1.1E+01	2.0E+01	1.4E+00	--	1.1E+01	2.0E+01	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	2.2E+03	5.9E+04	--	--	4.0E+00	1.1E+02	--	--	2.2E+02	5.9E+03	--	--	2.2E+02	5.9E+03	
Hexachloroethane F	0	--	--	1.4E+01	3.3E+01	--	--	1.6E+03	3.7E+03	--	--	1.4E+00	3.3E+00	--	--	1.6E+02	3.7E+02	--	--	1.6E+02	3.7E+02	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	7.1E+01	--	--	--	5.0E-01	--	--	--	2.1E+01	--	--	--	2.1E+01	--	--	
Indeno (1,2,3-cd) pyrene C	0	--	--	3.8E-02	1.8E-01	--	--	4.3E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.3E-01	2.0E+00	--	--	4.3E-01	2.0E+00	
Iron	0	--	--	3.0E+02	--	--	--	1.6E+04	--	--	--	3.0E+01	--	--	--	1.6E+03	--	--	--	1.6E+03	--	
Isophorone F	0	--	--	3.5E+02	9.6E+03	--	--	3.9E+04	1.1E+06	--	--	3.5E+01	9.6E+02	--	--	3.9E+03	1.1E+05	--	--	3.9E+03	1.1E+05	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	6.6E+01	9.7E+00	1.5E+01	--	9.8E+01	3.5E+02	8.1E+02	--	2.1E+01	2.4E+00	1.5E+00	--	7.2E+02	1.0E+02	8.1E+01	--	9.8E+01	1.0E+02	8.1E+01	--	
Malathion	0	--	1.0E-01	--	--	--	3.6E+00	--	--	--	2.5E-02	--	--	--	1.0E+00	--	--	--	1.0E+00	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	1.9E+03	--	--	--	1.8E+01	--	--	--	2.1E+02	--	--	--	2.1E+02	--	
Mercury	0	1.4E+00	7.7E-01	--	--	2.1E+00	2.7E+01	--	--	3.5E-01	1.9E-01	--	--	1.2E+01	8.0E+00	--	--	2.1E+00	8.0E+00	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	2.5E+03	8.1E+04	--	--	4.7E+00	1.5E+02	--	--	2.5E+02	8.1E+03	--	--	2.5E+02	8.1E+03	
Methylene Chloride C	0	--	--	4.6E+01	5.9E+03	--	--	5.1E+03	6.6E+05	--	--	4.6E+00	5.9E+02	--	--	5.1E+02	6.6E+04	--	--	5.1E+02	6.6E+04	
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.1E+00	5.4E+03	--	--	7.5E-03	1.0E+01	--	--	3.1E-01	5.4E+02	--	--	3.1E-01	5.4E+02		
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.2E+02	1.6E+01	6.1E+02	4.6E+03	1.8E+02	5.7E+02	3.3E+04	2.5E+05	3.7E+01	4.4E+00	6.1E+01	4.6E+02	1.2E+03	1.7E+02	3.3E+03	2.5E+04	1.8E+02	1.7E+02	3.3E+03	2.5E+04	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	4.9E+05	--	--	--	1.8E+03	--	--	--	5.0E+04	--	--	--	5.0E+04	--	
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	9.2E+02	3.7E+04	--	--	1.7E+00	6.9E+01	--	--	9.2E+01	3.7E+03	--	--	9.2E+01	3.7E+03	
N-Nitrosodimethylamine F	0	--	--	6.9E-03	3.0E+01	--	--	7.7E-01	3.4E+03	--	--	6.9E-04	3.0E+00	--	--	7.7E-02	3.4E+02	--	--	7.7E-02	3.4E+02	
N-Nitrosodiphenylamine F	0	--	--	3.3E+01	6.0E+01	--	--	3.7E+03	6.7E+03	--	--	3.3E+00	6.0E+00	--	--	3.7E+02	6.7E+02	--	--	3.7E+02	6.7E+02	
N-Nitrosodi-n-propylamine F	0	--	--	5.0E-02	5.1E+00	--	--	5.6E+00	5.7E+02	--	--	5.0E-03	5.1E-01	--	--	5.6E-01	5.7E+01	--	--	5.6E-01	5.7E+01	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	4.1E+01	2.4E+02	--	--	7.0E+00	1.7E+00	--	--	2.4E+02	6.9E+01	--	--	4.1E+01	6.9E+01	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	9.6E-02	4.6E-01	--	--	1.6E-02	3.3E-03	--	--	5.5E-01	1.4E-01	--	--	9.6E-02	1.4E-01	--	--	
PCB Total F	0	--	1.4E-02	6.4E-04	6.4E-04	--	5.0E-01	7.2E-02	7.2E-02	--	3.5E-03	6.4E-05	6.4E-05	--	1.5E-01	7.2E-03	7.2E-03	--	1.5E-01	7.2E-03	7.2E-03	
Pentachlorophenol C	0	8.0E+00	9.0E+00	2.7E+00	3.0E+01	1.2E+01	3.2E+02	3.0E+02	3.4E+03	2.9E+00	2.3E+00	2.7E-01	3.0E+00	9.9E+01	9.4E+01	3.0E+01	3.4E+02	1.2E+01	9.4E+01	3.0E+01	3.4E+02	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	5.4E+05	4.6E+07	--	--	1.0E+03	8.6E+04	--	--	5.4E+04	4.6E+06	--	--	5.4E+04	4.6E+06	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	4.5E+04	2.2E+05	--	--	8.3E+01	4.0E+02	--	--	4.5E+03	2.2E+04	--	--	4.5E+03	2.2E+04	
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	8.1E+02	--	--	--	1.5E+00	--	--	--	8.1E+01	--	--	--	8.1E+01	--	
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	2.2E+02	2.2E+02	--	--	4.0E-01	4.0E-01	--	--	2.2E+01	2.2E+01	--	--	2.2E+01	2.2E+01	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	2.7E+02	--	--	--	5.0E-01	--	--	--	2.7E+01	--	--	--	2.7E+01	--	
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.6E+03	--	--	--	3.0E+00	--	--	--	1.6E+02	--	--	--	1.6E+02	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	3.0E+01	1.8E+02	9.2E+03	2.9E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	1.7E+02	5.2E+01	9.2E+02	2.3E+04	3.0E+01	5.2E+01	9.2E+02	2.3E+04	
Silver	0	1.6E+00	--	--	--	2.3E+00	--	--	--	5.5E-01	--	--	--	1.9E+01	--	--	--	2.3E+00	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	1.3E+07	--	--	--	3.2E+04	--	--	--	1.3E+06	--	--	--	1.3E+06	--	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	1.9E+02	4.5E+03	--	--	1.7E-01	4.0E+00	--	--	1.9E+01	4.5E+02	--	--	1.9E+01	4.5E+02	
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	7.7E+02	3.7E+03	--	--	6.9E-01	3.3E+00	--	--	7.7E+01	3.7E+02	--	--	7.7E+01	3.7E+02	
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.3E+01	2.5E+01	--	--	2.4E-02	4.7E-02	--	--	1.3E+00	2.5E+00	--	--	1.3E+00	2.5E+00	
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	2.8E+04	3.2E+05	--	--	5.1E+01	6.0E+02	--	--	2.8E+03	3.2E+04	--	--	2.8E+03	3.2E+04	
Total dissolved solids	0	--	--	5.0E+05	--	--	--	2.7E+07	--	--	--	5.0E+04	--	--	--	2.7E+06	--	--	--	2.7E+06	--	
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.1E+00	7.1E-03	3.1E-01	3.1E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	6.2E+00	2.1E-03	3.1E-02	3.1E-02	1.1E+00	2.1E-03	3.1E-02	3.1E-02	
Tributyltin	0	4.6E-01	7.2E-02	--	--	6.8E-01	2.6E+00	--	--	1.2E-01	1.8E-02	--	--	3.9E+00	7.5E-01	--	--	6.8E-01	7.5E-01	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.9E+03	3.8E+03	--	--	3.5E+00	7.0E+00	--	--	1.9E+02	3.8E+02	--	--	1.9E+02	3.8E+02	
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	6.6E+02	1.8E+04	--	--	5.9E-01	1.6E+01	--	--	6.6E+01	1.8E+03	--	--	6.6E+01	1.8E+03	
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	2.8E+03	3.4E+04	--	--	2.5E+00	3.0E+01	--	--	2.8E+02	3.4E+03	--	--	2.8E+02	3.4E+03	
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	1.6E+03	2.7E+03	--	--	1.4E+00	2.4E+00	--	--	1.6E+02	2.7E+02	--	--	1.6E+02	2.7E+02	
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	2.7E+03	--	--	--	5.0E+00	--	--	--	2.7E+02	--	--	--	2.7E+02	--	
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	2.8E+01	2.7E+03	--	--	2.5E-02	2.4E+00	--	--	2.8E+00	2.7E+02	--	--	2.8E+00	2.7E+02	
Zinc	3.68	7.9E+01	9.5E+01	7.4E+03	2.6E+04	1.2E+02	3.3E+03	4.0E+05	1.4E+06	2.6E+01	2.7E+01	7.4E+02	2.6E+03	7.7E+02	9.6E+02	4.0E+04	1.4E+05	1.2E+02	9.6E+02	4.0E+04	1.4E+05	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
- Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
 $= (0.1(WQC - background conc.) + background conc.)$  for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.0E+01
Arsenic	5.2E+01
Barium	1.1E+04
Cadmium	1.4E+00
Chromium III	2.3E+02
Chromium VI	9.5E+00
Copper	5.0E+00
Iron	1.6E+03
Lead	3.9E+01
Manganese	2.1E+02
Mercury	8.3E-01
Nickel	7.3E+01
Selenium	1.2E+01
Silver	9.2E-01
Zinc	4.6E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 2:10:02 PM

Facility = VA0000248 - 006  
Chemical = Iron, Total  
Chronic averaging period = 4  
WLAA =  
WLAC = 1600  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

**Summary of Statistics:**

# observations = 1  
Expected Value = 144  
Variance = 7464.96  
C.V. = 0.6  
97th percentile daily values = 350.412  
97th percentile 4 day average = 239.585  
97th percentile 30 day average= 173.671  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

144







Cell: I9

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18

Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22

Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40

Comment:

If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41

Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.8", make sure you have selected "Y" in cell E20

Cell: L48

Comment:

See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62

Comment:

Vertebrates are:  
Pimephales promelas  
Oncorhynchus mykiss  
Cyprinodon variegatus

Cell: J62

Comment:

Invertebrates are:  
Ceriodaphnia dubia  
Mysidopsis bahia

Cell: C117

Comment: Vertebrates are:

Pimephales promelas  
Cyprinodon variegatus

Cell: M119

Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121

Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same:  $100/\text{NOEC} = \text{TUc}$  or  $100/\text{LC50} = \text{TUa}$ .

Cell: C138

Comment: Invertebrates are:

Ceriodaphnia dubia  
Mysidopsis bahia

4/8/2010 3:15:29 PM

Facility = RAAP - Outfall 006  
Chemical = Chronic Toxicity  
Chronic averaging period = 4  
WLAa = 4.435  
WLAc = 35.629  
Q.L. = 1  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 5  
Expected Value = 4.15  
Variance = 6.2001  
C.V. = 0.6  
97th percentile daily values = 10.0986  
97th percentile 4 day average = 6.90472  
97th percentile 30 day average= 5.00512  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity  
Maximum Daily Limit = 4.435  
Average Weekly limit = 4.435  
Average Monthly LImit = 4.435

The data are:

1  
1  
6.25  
6.25  
6.25

## Mixing Zone Predictions for

VA0000248 - 07

Effluent Flow = 5.554 MGD

Stream 7Q10 = 559 MGD

Stream 30Q10 = 646 MGD

Stream 1Q10 = 449 MGD

Stream slope = .001 ft/ft

Stream width = 600 ft

Bottom scale = 3

Channel scale = 1

---

### Mixing Zone Predictions @ 7Q10

Depth = 2.0899 ft

Length = 185118.25 ft

Velocity = .6969 ft/sec

Residence Time = 3.0742 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 65.06% of the 7Q10 is used.

---

### Mixing Zone Predictions @ 30Q10

Depth = 2.2781 ft

Length = 172211.24 ft

Velocity = .7379 ft/sec

Residence Time = 2.7012 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 74.04% of the 30Q10 is used.

---

### Mixing Zone Predictions @ 1Q10

Depth = 1.8344 ft

Length = 206480.06 ft

Velocity = .6393 ft/sec

Residence Time = 89.7176 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.11% of the 1Q10 is used.

---

**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 007

Permit No.: VA00000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	1.11 %	- 7Q10 Mix =	64.95 %	Mean Hardness (as CaCO <sub>3</sub> ) =	1277 mg/L		
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 30Q10 Mix =	73.93 %			90% Temp (Annual) =	33 deg C		
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	Wet Season - 1Q10 Mix =	100 %			90% Temp (Wet season) =	27 deg C		
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	529 MGD	- 30Q10 Mix =	100 %			90% Maximum pH =	7.8 SU		
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD					10% Maximum pH =	6.9 SU		
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD					Discharge Flow =	5.554 MGD		
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	8.8E+04	1.3E+05	--	--	6.7E+01	9.9E+01	--	--	--	8.8E+03	1.3E+04	--	--	8.8E+03	1.3E+04	
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	8.0E+02	1.2E+03	--	--	6.1E-01	9.3E-01	--	--	--	8.0E+01	1.2E+02	--	--	8.0E+01	1.2E+02	
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	1.4E+02	6.9E+02	--	--	5.1E-02	2.5E-01	--	--	--	1.4E+01	6.9E+01	--	--	1.4E+01	6.9E+01	
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	5.7E+00	--	1.3E-01	1.4E-01	7.5E-01	--	4.9E-05	5.0E-05	6.1E+01	--	1.3E-02	1.4E-02	5.7E+00	--	1.3E-02	1.4E-02		
Ammonia-N (mg/l) (Yearly)	0	6.16E+00	9.92E-01	--	--	1.2E+01	8.6E+01	--	--	9.35E-01	2.48E-01	--	--	7.7E+01	2.9E+01	--	--	1.2E+01	2.9E+01	--	--		
Ammonia-N (mg/l) (High Flow)	0	3.73E+00	1.75E+00	--	--	3.6E+02	3.4E+02	--	--	9.33E-01	4.37E-01	--	--	9.0E+01	8.4E+01	--	--	9.0E+01	8.4E+01	--	--		
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	1.1E+06	5.3E+06	--	--	8.3E+02	4.0E+03	--	--	1.1E+05	5.3E+05	--	--	1.1E+05	5.3E+05	--	--
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	7.4E+02	8.4E+04	--	--	5.6E-01	6.4E+01	--	--	7.4E+01	8.4E+03	--	--	7.4E+01	8.4E+03	--	--
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	6.4E+02	9.9E+03	1.3E+03	--	8.5E+01	3.8E+01	1.3E+00	--	6.9E+03	3.6E+03	1.3E+02	--	6.4E+02	3.8E+03	1.3E+02	--		
Barium	0	--	--	2.0E+03	--	--	--	2.6E+05	--	--	--	2.0E+02	--	--	--	2.6E+04	--	--	--	2.6E+04	--	--	
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	6.0E+03	1.4E+05	--	--	2.2E+00	5.1E+01	--	--	6.0E+02	1.4E+04	--	--	6.0E+02	1.4E+04	--	
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	2.4E-01	5.5E-01	--	--	8.6E-05	2.0E-04	--	--	2.4E-02	5.5E-02	--	--	2.4E-02	5.5E-02	--	
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00	--	
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00	--	
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00	--	
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00	--	
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	8.2E+01	1.5E+03	--	--	3.0E-02	5.3E-01	--	--	8.2E+00	1.5E+02	--	--	8.2E+00	1.5E+02	--	
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.8E+05	8.6E+06	--	--	1.4E+02	6.5E+03	--	--	1.8E+04	8.6E+05	--	--	1.8E+04	8.6E+05	--	
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	3.3E+03	6.0E+03	--	--	1.2E+00	2.2E+00	--	--	3.3E+02	6.0E+02	--	--	3.3E+02	6.0E+02	--	
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	1.2E+04	3.8E+05	--	--	4.3E+00	1.4E+02	--	--	1.2E+03	3.8E+04	--	--	1.2E+03	3.8E+04	--	
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	2.0E+05	2.5E+05	--	--	1.5E+02	1.9E+02	--	--	2.0E+04	2.5E+04	--	--	2.0E+04	2.5E+04	--	
Cadmium	0	1.9E+01	1.1E+00	5.0E+00	--	3.6E+01	7.3E+01	6.6E+02	--	9.0E-01	2.6E-01	5.0E-01	--	7.4E+01	2.6E+01	6.6E+01	--	3.6E+01	2.6E+01	6.6E+01	--		
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	6.3E+02	4.4E+03	--	--	2.3E-01	1.6E+00	--	--	6.3E+01	4.4E+02	--	--	6.3E+01	4.4E+02	--	
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	4.6E+00	2.9E-01	2.2E+00	2.2E+00	6.0E-01	1.1E-03	8.0E-04	8.1E-04	4.9E+01	1.1E-01	2.2E-01	2.2E-01	4.6E+00	1.1E-01	2.2E-01	2.2E-01		
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	1.6E+06	1.5E+07	3.2E+07	--	2.2E+05	6.3E+04	3.2E+04	--	1.7E+07	5.7E+06	3.2E+06	--	1.6E+06	5.7E+06	3.2E+06	--		
TRC	0	1.9E+01	1.1E+01	--	--	3.6E+01	7.3E+02	--	--	4.8E+00	2.8E+00	--	--	3.9E+02	2.8E+02	--	--	3.6E+01	2.8E+02	--	--		
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.7E+04	2.1E+05	--	--	1.3E+01	1.6E+02	--	--	1.7E+03	2.1E+04	--	--	1.7E+03	2.1E+04	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	1.1E+03	3.6E+04	--	--	4.0E-01	1.3E+01	--	--	1.1E+02	3.6E+03	--	--	1.1E+02	3.6E+03
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	4.5E+04	1.4E+06	--	--	3.4E+01	1.1E+03	--	--	4.5E+03	1.4E+05	--	--	4.5E+03	1.4E+05
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.3E+05	2.1E+05	--	--	1.0E+02	1.6E+02	--	--	1.3E+04	2.1E+04	--	--	1.3E+04	2.1E+04
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	1.1E+04	2.0E+04	--	--	8.1E+00	1.5E+01	--	--	1.1E+03	2.0E+03	--	--	1.1E+03	2.0E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.6E-01	2.7E+00	--	--	2.1E-02	1.0E-02	--	--	1.7E+00	1.0E+00	--	--	1.6E-01	1.0E+00	--	--
Chromium III	0	1.8E+03	7.2E+01	--	--	3.4E+03	4.8E+03	--	--	1.3E+02	1.7E+01	--	--	1.1E+04	1.7E+03	--	--	3.4E+03	1.7E+03	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	3.0E+01	7.3E+02	--	--	4.0E+00	2.8E+00	--	--	3.3E+02	2.8E+02	--	--	3.0E+01	2.8E+02	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	1.3E+04	--	--	--	1.0E+01	--	--	--	1.3E+03	--	--	--	1.3E+03	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	3.8E-04	1.8E-03	--	--	1.0E-01	4.9E-01	--	--	1.0E-01	4.9E-01
Copper	0.65	5.0E+01	8.7E+00	1.3E+03	--	9.4E+01	5.3E+02	1.7E+05	--	3.6E+00	2.5E+00	1.3E+02	--	2.4E+02	1.9E+02	1.7E+04	--	9.4E+01	1.9E+02	1.7E+04	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	4.2E+01	3.5E+02	1.8E+04	2.1E+06	5.5E+00	1.3E+00	1.4E+01	1.6E+03	4.5E+02	1.3E+02	1.8E+03	2.1E+05	4.2E+01	1.3E+02	1.8E+03	2.1E+05
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	8.5E-01	8.5E-01	--	--	3.1E-04	3.1E-04	--	--	8.5E-02	8.5E-02	--	--	8.5E-02	8.5E-02
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	6.0E-01	6.0E-01	--	--	2.2E-04	2.2E-04	--	--	6.0E-02	6.0E-02	--	--	6.0E-02	6.0E-02
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.1E+00	6.6E-02	6.0E-01	6.0E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	2.3E+01	2.5E-02	6.0E-02	6.0E-02	2.1E+00	2.5E-02	6.0E-02	6.0E-02
Demeton	0	--	--	1.0E-01	--	--	--	6.6E+00	--	--	--	2.5E-02	--	--	--	2.5E+00	--	--	--	2.5E+00	--
Diazinon	0	1.7E-01	1.7E-01	--	--	3.2E-01	1.1E+01	--	--	4.3E-02	4.3E-02	--	--	3.5E+00	4.3E+00	--	--	3.2E-01	4.3E+00	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	5.5E+04	1.7E+05	--	--	4.2E+01	1.3E+02	--	--	5.5E+03	1.7E+04	--	--	5.5E+03	1.7E+04
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	4.2E+04	1.3E+05	--	--	3.2E+01	9.6E+01	--	--	4.2E+03	1.3E+04	--	--	4.2E+03	1.3E+04
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	8.3E+03	2.5E+04	--	--	6.3E+00	1.9E+01	--	--	8.3E+02	2.5E+03	--	--	8.3E+02	2.5E+03
3,3-Dichlorobenzidine <sup>b</sup>	0	--	--	2.1E-01	2.8E-01	--	--	5.8E+01	7.7E+01	--	--	2.1E-02	2.8E-02	--	--	5.8E+00	7.7E+00	--	--	5.8E+00	7.7E+00
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	1.5E+03	4.7E+04	--	--	5.5E-01	1.7E+01	--	--	1.5E+02	4.7E+03	--	--	1.5E+02	4.7E+03
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	1.0E+03	1.0E+05	--	--	3.8E-01	3.7E+01	--	--	1.0E+02	1.0E+04	--	--	1.0E+02	1.0E+04
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	4.3E+04	9.4E+05	--	--	3.3E+01	7.1E+02	--	--	4.3E+03	9.4E+04	--	--	4.3E+03	9.4E+04
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.8E+04	1.3E+06	--	--	1.4E+01	1.0E+03	--	--	1.8E+03	1.3E+05	--	--	1.8E+03	1.3E+05
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.0E+04	3.8E+04	--	--	7.7E+00	2.9E+01	--	--	1.0E+03	3.8E+03	--	--	1.0E+03	3.8E+03
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.3E+04	--	--	--	1.0E+01	--	--	--	1.3E+03	--	--	--	1.3E+03	--
1,2-Dichloropropane <sup>b</sup>	0	--	--	5.0E+00	1.5E+02	--	--	1.4E+03	4.1E+04	--	--	5.0E-01	1.5E+01	--	--	1.4E+02	4.1E+03	--	--	1.4E+02	4.1E+03
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	9.3E+02	5.8E+04	--	--	3.4E-01	2.1E+01	--	--	9.3E+01	5.8E+03	--	--	9.3E+01	5.8E+03
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	4.6E-01	3.7E+00	1.4E-01	1.5E-01	6.0E-02	1.4E-02	5.2E-05	5.4E-05	4.9E+00	1.4E+00	1.4E-02	4.6E-01	1.4E+00	1.4E-02	4.6E-01	1.5E-02
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	2.2E+06	5.8E+06	--	--	1.7E+03	4.4E+03	--	--	2.2E+05	5.8E+05	--	--	2.2E+05	5.8E+05
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	5.0E+04	1.1E+05	--	--	3.8E+01	8.5E+01	--	--	5.0E+03	1.1E+04	--	--	5.0E+03	1.1E+04
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	3.6E+07	1.4E+08	--	--	2.7E+04	1.1E+05	--	--	3.6E+06	1.4E+07	--	--	3.6E+06	1.4E+07
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.6E+05	5.9E+05	--	--	2.0E+02	4.5E+02	--	--	2.6E+04	5.9E+04	--	--	2.6E+04	5.9E+04
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	9.1E+03	7.0E+05	--	--	6.9E+00	5.3E+02	--	--	9.1E+02	7.0E+04	--	--	9.1E+02	7.0E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.7E+03	3.7E+04	--	--	1.3E+00	2.8E+01	--	--	1.7E+02	3.7E+03	--	--	1.7E+02	3.7E+03
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	3.0E+02	9.3E+03	--	--	1.1E-01	3.4E+00	--	--	3.0E+01	9.3E+02	--	--	3.0E+01	9.3E+02
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	6.6E-06	6.7E-06	--	--	5.0E-09	5.1E-09	--	--	5.6E-07	6.7E-07	--	--	5.6E-07	6.7E-07
1,2-Diphenylhydrazine <sup>b</sup>	0	--	--	3.6E-01	2.0E+00	--	--	9.9E+01	5.5E+02	--	--	3.6E-02	2.0E-01	--	--	9.9E+00	5.5E+01	--	--	9.9E+00	5.5E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.2E-01	3.7E+00	8.2E+03	1.2E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	4.5E+00	1.4E+00	8.2E+02	1.2E+03	4.2E-01	1.4E+00	8.2E+02	1.2E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.2E-01	3.7E+00	8.2E+03	1.2E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	4.5E+00	1.4E+00	8.2E+02	1.2E+03	4.2E-01	1.4E+00	8.2E+02	1.2E+03
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.2E-01	3.7E+00	--	--	5.5E-02	1.4E-02	--	--	4.5E+00	1.4E+00	--	--	4.2E-01	1.4E+00	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	8.2E+03	1.2E+04	--	--	6.2E+00	8.9E+00	--	--	8.2E+02	1.2E+03	--	--	8.2E+02	1.2E+03
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.6E-01	2.4E+00	7.8E+00	7.9E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	1.8E+00	9.1E-01	7.8E-01	7.9E-01	1.6E-01	9.1E-01	7.8E-01	7.9E-01
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.8E+01	4.0E+01	--	--	2.9E-02	3.0E-02	--	--	3.8E+00	4.0E+00	--	--	3.8E+00	4.0E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	7.0E+04	2.8E+05	--	--	5.3E+01	2.1E+02	--	--	--	7.0E+03	2.8E+04	--	--	7.0E+03	2.8E+04	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.7E+04	1.8E+04	--	--	1.3E+01	1.4E+01	--	--	--	1.7E+03	1.8E+03	--	--	1.7E+03	1.8E+03	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.4E+05	7.0E+05	--	--	1.1E+02	5.3E+02	--	--	--	1.4E+04	7.0E+04	--	--	1.4E+04	7.0E+04	
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.6E+04	--	--	--	5.0E+01	--	--	--	--	6.6E+03	--	--	--	6.6E+03	--	
Guthion	0	--	1.0E-02	--	--	--	6.6E-01	--	--	--	2.5E-03	--	--	--	--	2.5E-01	--	--	--	2.5E-01	--	--	
Heptachlor	c	5.2E-01	3.8E-03	7.9E-04	7.9E-04	9.9E-01	2.5E-01	2.2E-01	2.2E-01	1.3E-01	9.5E-04	7.9E-05	7.9E-05	1.1E+01	9.7E-02	2.2E-02	2.2E-02	9.9E-01	9.7E-02	2.2E-02	2.2E-02		
Heptachlor Epoxide	f	5.2E-01	3.8E-03	3.9E-04	3.9E-04	9.9E-01	2.5E-01	1.1E-01	1.1E-01	1.3E-01	9.5E-04	3.9E-05	3.9E-05	1.1E+01	9.7E-02	1.1E-02	1.1E-02	9.9E-01	9.7E-02	1.1E-02	1.1E-02		
Hexachlorobenzene	f	0	--	2.8E-03	2.9E-03	--	--	7.7E-01	8.0E-01	--	--	2.8E-04	2.9E-04	--	--	--	7.7E-02	8.0E-02	--	--	7.7E-02	8.0E-02	
Hexachlorobutadiene	f	0	--	--	4.4E+00	1.8E+02	--	--	1.2E+03	4.9E+04	--	--	4.4E-01	1.8E+01	--	--	--	1.2E+02	4.9E+03	--	--	1.2E+02	4.9E+03
Hexachlorocyclohexane																							
Alpha-BHC	c	0	--	--	2.6E-02	4.9E-02	--	--	7.1E+00	1.3E+01	--	--	2.6E-03	4.9E-03	--	--	--	7.1E-01	1.3E+00	--	--	7.1E-01	1.3E+00
Hexachlorocyclohexane Beta	BHC	0	--	--	9.1E-02	1.7E-01	--	--	2.5E+01	4.7E+01	--	--	9.1E-03	1.7E-02	--	--	--	2.5E+00	4.7E+00	--	--	2.5E+00	4.7E+00
Hexachlorocyclohexane																							
Gamma-BHC (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.8E+00	--	2.7E+02	4.9E+02	2.4E-01	--	9.8E-02	1.8E-01	1.9E+01	--	2.7E+01	4.9E+01	1.8E+00	--	2.7E+01	4.9E+01		
Hexachlorocyclopentadiene		0	--	--	4.0E+01	1.1E+03	--	--	5.3E+03	1.4E+05	--	--	4.0E+00	1.1E+02	--	--	--	5.3E+02	1.4E+04	--	--	5.3E+02	1.4E+04
Hexachloroethane	f	0	--	--	1.4E+01	3.3E+01	--	--	3.8E+03	9.1E+03	--	--	1.4E+00	3.3E+00	--	--	--	3.8E+02	9.1E+02	--	--	3.8E+02	9.1E+02
Hydrogen Sulfide		0	--	2.0E+00	--	--	1.3E+02	--	--	--	5.0E-01	--	--	--	5.1E+01	--	--	--	5.1E+01	--	--	--	
Indeno (1,2,3-cd) pyrene	c	0	--	--	3.8E-02	1.8E-01	--	--	1.0E+01	4.9E+01	--	--	3.8E-03	1.8E-02	--	--	--	1.0E+00	4.9E+00	--	--	1.0E+00	4.9E+00
Iron		0	--	--	3.0E+02	--	--	--	4.0E+04	--	--	--	3.0E+01	--	--	--	--	4.0E+03	--	--	--	4.0E+03	--
Isophorone	f	0	--	--	3.5E+02	9.6E+03	--	--	9.6E+04	2.6E+06	--	--	3.5E+01	9.6E+02	--	--	--	9.6E+03	2.6E+05	--	--	9.6E+03	2.6E+05
Kepone		0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	0.0E+00	--	--	--	0.0E+00	--	
Lead		0	6.9E+02	1.3E+01	1.5E+01	--	1.3E+03	8.5E+02	2.0E+03	--	2.7E+01	2.9E+00	1.5E+00	--	2.2E+03	3.0E+02	2.0E+02	--	1.3E+03	3.0E+02	2.0E+02	--	
Malathion		0	--	1.0E-01	--	--	--	6.6E+00	--	--	--	2.5E-02	--	--	--	--	2.5E+00	--	--	--	2.5E+00	--	
Manganese		14.32	--	--	5.0E+01	--	--	--	4.7E+03	--	--	--	1.8E+01	--	--	--	--	4.8E+02	--	--	--	4.8E+02	--
Mercury		0	1.4E+00	7.7E-01	--	--	2.7E+00	5.1E+01	--	--	3.5E-01	1.9E-01	--	--	2.9E+01	2.0E+01	--	--	2.7E+00	2.0E+01	--	--	
Methyl Bromide		0	--	--	4.7E+01	1.5E+03	--	--	6.2E+03	2.0E+05	--	--	4.7E+00	1.5E+02	--	--	--	6.2E+02	2.0E+04	--	--	6.2E+02	2.0E+04
Methylene Chloride	c	0	--	--	4.6E+01	5.9E+03	--	--	1.3E+04	1.6E+06	--	--	4.6E+00	5.9E+02	--	--	--	1.3E+03	1.6E+05	--	--	1.3E+03	1.6E+05
Methoxychlor		0	--	3.0E-02	1.0E+02	--	--	2.0E+00	1.3E+04	--	--	7.5E-03	1.0E+01	--	--	--	7.6E-01	1.3E+03	--	--	7.6E-01	1.3E+03	
Mirex		0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	0.0E+00	--	--	--	0.0E+00	--	
Nickel		0.39	5.9E+02	2.0E+01	6.1E+02	4.6E+03	1.1E+03	1.3E+03	8.0E+04	6.1E+05	4.3E+01	4.9E+00	6.1E+01	4.6E+02	3.5E+03	4.6E+02	8.0E+03	6.1E+04	1.1E+03	4.6E+02	8.0E+03	6.1E+04	
Nitrate (as N)		890	--	--	1.0E+04	--	--	--	1.2E+06	--	--	--	1.8E+03	--	--	--	--	1.2E+05	--	--	--	1.2E+05	--
Nitrobenzene		0	--	--	1.7E+01	6.9E+02	--	--	2.2E+03	9.1E+04	--	--	1.7E+00	6.9E+01	--	--	--	2.2E+02	9.1E+03	--	--	2.2E+02	9.1E+03
N-Nitrosodimethylamine	f	0	--	--	6.9E-03	3.0E+01	--	--	1.9E+00	8.2E+03	--	--	6.9E-04	3.0E+00	--	--	--	1.9E-01	8.2E+02	--	--	1.9E-01	8.2E+02
N-Nitrosodiphenylamine	f	0	--	--	3.3E+01	6.0E+01	--	--	9.1E+03	1.6E+04	--	--	3.3E+00	6.0E+00	--	--	--	9.1E+02	1.6E+03	--	--	9.1E+02	1.6E+03
N-Nitrosodi-n-propylamine	f	0	--	--	5.0E-02	5.1E+00	--	--	1.4E+01	1.4E+03	--	--	5.0E-03	5.1E-01	--	--	--	1.4E+00	1.4E+02	--	--	1.4E+00	1.4E+02
Nonylphenol		0	2.8E+01	6.6E+00	--	--	5.3E+01	4.4E+02	--	--	7.0E+00	1.7E+00	--	--	5.7E+02	1.7E+02	--	--	5.3E+01	1.7E+02	--	--	
Parathion		0	6.5E-02	1.3E-02	--	--	1.2E-01	8.6E-01	--	--	1.6E-02	3.3E-03	--	--	1.3E+00	3.3E-01	--	--	1.2E-01	3.3E-01	--	--	
PCB Total	f	0	--	1.4E-02	6.4E-04	6.4E-04	--	9.3E-01	1.8E-01	1.8E-01	--	3.5E-03	6.4E-05	6.4E-05	--	3.6E-01	1.8E-02	1.8E-02	--	3.6E-01	1.8E-02	1.8E-02	
Pentachlorophenol	c	0	9.2E+00	9.1E+00	2.7E+00	3.0E+01	1.7E+01	6.1E+02	7.4E+02	8.2E+03	3.0E+00	2.3E+00	2.7E-01	3.0E+00	2.4E+02	2.3E+02	7.4E+01	8.2E+02	1.7E+01	2.3E+02	7.4E+01	8.2E+02	
Phenol		0	--	--	1.0E+04	8.6E+05	--	--	1.3E+06	1.1E+08	--	--	1.0E+03	8.6E+04	--	--	--	1.3E+05	1.1E+07	--	--	1.3E+05	1.1E+07
Pyrene		0	--	--	8.3E+02	4.0E+03	--	--	1.1E+05	5.3E+05	--	--	8.3E+01	4.0E+02	--	--	--	1.1E+04	5.3E+04	--	--	1.1E+04	5.3E+04
Radionuclides		0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Gross Alpha Activity																							
(pCi/L)																							
Beta and Photon Activity																							
(mrem/yr)																							
Radium 226 + 228 (pCi/L)																							
Uranium (ug/l)																							

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	3.8E+01	3.3E+02	2.2E+04	5.5E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	4.1E+02	1.3E+02	2.2E+03	5.5E+04	3.8E+01	1.3E+02	2.2E+03	5.5E+04	
Silver	0	3.7E+01	--	--	--	7.1E+01	--	--	--	7.6E-01	--	--	--	6.2E+01	--	--	--	6.2E+01	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	3.2E+07	--	--	--	3.2E+04	--	--	--	--	3.2E+06	--	--	3.2E+06	--	
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	4.7E+02	1.1E+04	--	--	1.7E-01	4.0E+00	--	--	--	4.7E+01	1.1E+03	--	--	4.7E+01	1.1E+03
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	1.9E+03	9.1E+03	--	--	6.9E-01	3.3E+00	--	--	--	1.9E+02	9.1E+02	--	--	1.9E+02	9.1E+02
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	3.2E+01	6.2E+01	--	--	2.4E-02	4.7E-02	--	--	--	3.2E+00	6.2E+00	--	--	3.2E+00	6.2E+00
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	6.7E+04	7.9E+05	--	--	5.1E+01	6.0E+02	--	--	--	6.7E+03	7.9E+04	--	--	6.7E+03	7.9E+04
Total dissolved solids	0	--	--	5.0E+05	--	--	--	6.6E+07	--	--	--	5.0E+04	--	--	--	--	6.6E+06	--	--	--	6.6E+06	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.4E+00	1.3E-02	7.7E-01	7.7E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.5E+01	5.1E-03	7.7E-02	7.7E-02	1.4E+00	5.1E-03	7.7E-02	7.7E-02	
Tributyltin	0	4.6E-01	7.2E-02	--	--	8.7E-01	4.8E+00	--	--	1.2E-01	1.8E-02	--	--	9.4E+00	1.8E+00	--	--	8.7E-01	1.8E+00	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	4.6E+03	9.2E+03	--	--	3.5E+00	7.0E+00	--	--	--	4.6E+02	9.2E+02	--	--	4.6E+02	9.2E+02
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	1.6E+03	4.4E+04	--	--	5.9E-01	1.6E+01	--	--	--	1.6E+02	4.4E+03	--	--	1.6E+02	4.4E+03
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	6.9E+03	8.2E+04	--	--	2.5E+00	3.0E+01	--	--	--	6.9E+02	8.2E+03	--	--	6.9E+02	8.2E+03
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	3.8E+03	6.6E+03	--	--	1.4E+00	2.4E+00	--	--	--	3.8E+02	6.6E+02	--	--	3.8E+02	6.6E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	6.6E+03	--	--	--	5.0E+00	--	--	--	--	6.6E+02	--	--	--	6.6E+02	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	6.9E+01	6.6E+03	--	--	2.5E-02	2.4E+00	--	--	--	6.9E+00	6.6E+02	--	--	6.9E+00	6.6E+02
Zinc	3.68	3.8E+02	1.1E+02	7.4E+03	2.6E+04	7.2E+02	7.3E+03	9.7E+05	3.4E+06	3.0E+01	3.0E+01	7.4E+02	2.6E+03	2.2E+03	2.7E+03	9.7E+04	3.4E+05	7.2E+02	2.7E+03	9.7E+04	3.4E+05	

## Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	7.4E+01
Arsenic	1.3E+02
Barium	2.6E+04
Cadmium	1.4E+01
Chromium III	1.0E+03
Chromium VI	1.2E+01
Copper	3.7E+01
Iron	4.0E+03
Lead	1.8E+02
Manganese	4.8E+02
Mercury	1.1E+00
Nickel	2.8E+02
Selenium	1.5E+01
Silver	2.5E+01
Zinc	2.9E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 2:18:08 PM

Facility = VA0000248 - 007  
Chemical = Copper, Total  
Chronic averaging period = 4  
WLAA = 94  
WLAC = 190  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 26.7  
Variance = 256.640  
C.V. = 0.6  
97th percentile daily values = 64.9722  
97th percentile 4 day average = 44.4231  
97th percentile 30 day average= 32.2016  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

26.7

4/12/2010 2:18:54 PM

Facility = VA0000248 - 007

Chemical = Iron, Total

Chronic averaging period = 4

WLAA =

WLAC = 4000

Q.L. = 10

# samples/mo. = 1

# samples/wk. = 1

**Summary of Statistics:**

# observations = 1

Expected Value = 305

Variance = 33489

C.V. = 0.6

97th percentile daily values = 742.192

97th percentile 4 day average = 507.455

97th percentile 30 day average= 367.846

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

305

4/12/2010 2:23:30 PM

Facility = VA0000248 - 007

Chemical = Lead, Total

Chronic averaging period = 4

WLAA = 1300

WLAC = 300

Q.L. = 1

# samples/mo. = 1

# samples/wk. = 1

**Summary of Statistics:**

# observations = 1

Expected Value = 1.2

Variance = .5184

C.V. = 0.6

97th percentile daily values = 2.92010

97th percentile 4 day average = 1.99654

97th percentile 30 day average= 1.44726

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.2

4/12/2010 2:27:12 PM

Facility = VA0000248 - 007  
Chemical = Manganese, Total  
Chronic averaging period = 4  
WLAA =  
WLAC = 480  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 55  
Variance = 1089  
C.V. = 0.6  
97th percentile daily values = 133.837  
97th percentile 4 day average = 91.5084  
97th percentile 30 day average= 66.3329  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

4/12/2010 2:27:58 PM

Facility = VA0000248 - 007  
Chemical = Zinc, Total  
Chronic averaging period = 4  
WLAa = 720  
WLAc = 2700  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 10  
Variance = 36  
C.V. = 0.6  
97th percentile daily values = 24.3341  
97th percentile 4 day average = 16.6379  
97th percentile 30 day average= 12.0605  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

4/13/2010 2:41:23 PM

Facility = VA0000248 - 007  
Chemical = Ammonia  
Chronic averaging period = 4  
WLAa = 12  
WLAc = 29  
Q.L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 55  
Expected Value = .098473  
Variance = .003490  
C.V. = 0.6  
97th percentile daily values = .239628  
97th percentile 4 day average = .163839  
97th percentile 30 day average= .118764  
# < Q.L. = 52  
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0.09  
0  
0  
0  
0  
0  
0.27  
0  
0  
0  
0  
0  
0  
0  
0  
0.15  
0  
0.1  
0  
0.1  
0.25  
0.1  
0  
0

4/12/2010 2:29:28 PM

Facility = VA0000248 - 007

Chemical = Chromium, Total

Chronic averaging period = 4

WLAA =

WLAC = 1300

Q.L. = 1

# samples/mo. = 1

# samples/wk. = 1

**Summary of Statistics:**

# observations = 1

Expected Value = 9.5

Variance = 32.49

C.V. = 0.6

97th percentile daily values = 23.1174

97th percentile 4 day average = 15.8060

97th percentile 30 day average= 11.4575

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9.5

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	<b>Spreadsheet for determination of WET test endpoints or WET limits</b>													
2														
3														
4														
5	Excel 97	Acute Endpoint/Permit Limit						Use as LC <sub>50</sub> in Special Condition, as TU <sub>a</sub> on DMR						
6	Revision Date: 01/10/05							ACUTE	3.217664305	TU <sub>a</sub>	LC <sub>50</sub> =	32 %	Use as	3.12 TU <sub>a</sub>
7	File: WETLIM10.xls (MIX.EXE required also)							ACUTE WLAA	6.6		Note: Inform the permittee that if the mean of the data exceeds this TU <sub>a</sub> :	1.0	a limit may result using WLAA.EXE	
8														
9														
10														
11		Chronic Endpoint/Permit Limit						Use as NOEC in Special Condition, as TUC on DMR						
12								CHRONIC	32.17664305	TU <sub>c</sub>	NOEC =	4 %	Use as	25.00 TU <sub>c</sub>
13								BOTH*	66.00000162	TU <sub>c</sub>	NOEC =	2 %	Use as	50.00 TU <sub>c</sub>
14								AML	32.17664305	TU <sub>c</sub>	NOEC =	4 %	Use as	25.00 TU <sub>c</sub>
15	Enter data in the cells with blue type:													
16														
17	Entry Date:	04/08/10						ACUTE WLAA,c	66		Note: Inform the permittee that if the mean of the data exceeds this TUC:	13.22282		
18	Facility Name:							CHRONIC WLAC	22					
19	VPDES Number:	VA0000248						*	Both means acute expressed as chronic					
20	Outfall Number:	7												
21		% Flow to be used from MIX.EXE						Diffuser /modeling study?						
22	Plant Flow:	5.554 MGD						Enter Y/N	Y					
23	Acute 1Q10:	449 MGD						Acute	22					
24	Chronic 7Q10:	559 MGD						Chronic	22					
25														
26	Are data available to calculate CV? (Y/N)	N						(Minimum of 10 data points, same species, needed)						
27	Are data available to calculate ACR? (Y/N)	N						(NOEC < LC50, do not use greater/less than data)						
28									Go to Page 2					
29									Go to Page 3					
30	IWC <sub>a</sub>	4.545454545 % Plant flow/plant flow + 1Q10						NOTE: If the IWC <sub>a</sub> is >33%, specify the						
31	IWC <sub>c</sub>	4.545454545 % Plant flow/plant flow + 7Q10						NOAEC = 100% test/endpoint for use						
32														
33	Dilution, acute	22 100/IWC <sub>a</sub>												
34	Dilution, chronic	22 100/IWC <sub>c</sub>												
35														
36	WLA <sub>a</sub>	6.6 Instream criterion (0.3 TU <sub>a</sub> ) X's Dilution, acute												
37	WLA <sub>c</sub>	22 Instream criterion (1.0 TU <sub>c</sub> ) X's Dilution, chronic												
38	WLA <sub>a,c</sub>	66 ACR X's WLA <sub>a</sub> - converts acute WLA to chronic units												
39														
40	ACR -acute/chronic ratio	10 LC50/NOEC (Default is 10 - if data are available, use tables Page 3)												
41	CV-Coefficient of variation	0.6 Default of 0.6 - if data are available, use tables Page 2)												
42	Constants eA	0.4109447 Default = 0.41												
43	eB	0.6010373 Default = 0.60												
44	eC	2.4334175 Default = 2.43												
45	eD	2.4334175 Default = 2.43 (1 samp) No. of sample 1 **The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAA,c and MDL using it are driven by the ACR.												
46														
47	LTA <sub>a,c</sub>	27.1223502 WLAA,c X's eA												
48	LTA <sub>c</sub>	13.2228206 WLAc X's eB							Rounded NOEC's %					
49	MDL** with LTA <sub>a,c</sub>	66.00000162 TU <sub>a</sub> NOEC = 1.515151 (Protects from acute/chronic toxicity)							NOEC = 2 %					
50	MDL** with LTA <sub>c</sub>	32.17664305 TU <sub>c</sub> NOEC = 3.107844 (Protects from chronic toxicity)							NOEC = 4 %					
51	AML with lowest LTA	32.17664305 TU <sub>c</sub> NOEC = 3.107844 Lowest LTA X's eD							NOEC = 4					
52														
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU <sub>c</sub> to TU <sub>a</sub>								Rounded LC50's %					
54	MDL with LTA <sub>a,c</sub>	6.600000162 TU <sub>a</sub> LC50 = 15.15151 %							LC50 = 16 %					
55	MDL with LTA <sub>c</sub>	3.217664305 TU <sub>c</sub> LC50 = 31.07844 %							LC50 = 32					
56														
57														
58														



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
110	111	112	113	114	115	116	117	118	119	120	121	122	123	124
	Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)		To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results.	acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute	LC <sub>50</sub> , since the ACR divides the LC <sub>50</sub> by the NOEC. LC <sub>50</sub> 's >100% should not be used.									
125	126	127	128	129	130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179	180	181	182	183	184
185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210	211	212	213	214
215	216	217	218	219	220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239	240	241	242	243	244
245	246	247	248	249	250	251	252	253	254	255	256	257	258	259
260	261	262	263	264	265	266	267	268	269	270	271	272	273	274
275	276	277	278	279	280	281	282	283	284	285	286	287	288	289
290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
305	306	307	308	309	310	311	312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327	328	329	330	331	332	333	334
335	336	337	338	339	340	341	342	343	344	345	346	347	348	349
350	351	352	353	354	355	356	357	358	359	360	361	362	363	364
365	366	367	368	369	370	371	372	373	374	375	376	377	378	379
380	381	382	383	384	385	386	387	388	389	390	391	392	393	394
395	396	397	398	399	400	401	402	403	404	405	406	407	408	409
410	411	412	413	414	415	416	417	418	419	420	421	422	423	424
425	426	427	428	429	430	431	432	433	434	435	436	437	438	439
440	441	442	443	444	445	446	447	448	449	450	451	452	453	454
455	456	457	458	459	460	461	462	463	464	465	466	467	468	469
470	471	472	473	474	475	476	477	478	479	480	481	482	483	484
485	486	487	488	489	490	491	492	493	494	495	496	497	498	499
500	501	502	503	504	505	506	507	508	509	510	511	512	513	514
515	516	517	518	519	520	521	522	523	524	525	526	527	528	529
530	531	532	533	534	535	536	537	538	539	540	541	542	543	544
545	546	547	548	549	550	551	552	553	554	555	556	557	558	559
560	561	562	563	564	565	566	567	568	569	570	571	572	573	574
575	576	577	578	579	580	581	582	583	584	585	586	587	588	589
590	591	592	593	594	595	596	597	598	599	600	601	602	603	604
605	606	607	608	609	610	611	612	613	614	615	616	617	618	619
620	621	622	623	624	625	626	627	628	629	630	631	632	633	634
635	636	637	638	639	640	641	642	643	644	645	646	647	648	649
650	651	652	653	654	655	656	657	658	659	660	661	662	663	664
665	666	667	668	669	670	671	672	673	674	675	676	677	678	679
680	681	682	683	684	685	686	687	688	689	690	691	692	693	694
695	696	697	698	699	700	701	702	703	704	705	706	707	708	709
710	711	712	713	714	715	716	717	718	719	720	721	722	723	724
725	726	727	728	729	730	731	732	733	734	735	736	737	738	739
740	741	742	743	744	745	746	747	748	749	750	751	752	753	754
755	756	757	758	759	760	761	762	763	764	765	766	767	768	769
770	771	772	773	774	775	776	777	778	779	780	781	782	783	784
785	786	787	788	789	790	791	792	793	794	795	796	797	798	799
800	801	802	803	804	805	806	807	808	809	810	811	812	813	814
815	816	817	818	819	820	821	822	823	824	825	826	827	828	829
830	831	832	833	834	835	836	837	838	839	840	841	842	843	844
845	846	847	848	849	850	851	852	853	854	855	856	857	858	859
860	861	862	863	864	865	866	867	868	869	870	871	872	873	874
875	876	877	878	879	880	881	882	883	884	885	886	887	888	889
890	891	892	893	894	895	896	897	898	899	900	901	902	903	904
905	906	907	908	909	910	911	912	913	914	915	916	917	918	919
920	921	922	923	924	925	926	927	928	929	930	931	932	933	934
935	936	937	938	939	940	941	942	943	944	945	946	947	948	949
950	951	952	953	954	955	956	957	958	959	960	961	962	963	964
965	966	967	968	969	970	971	972	973	974	975	976	977	978	979
980	981	982	983	984	985	986	987	988	989	990	991	992	993	994
995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009
1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024
1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039
1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054
1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069
1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084
1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099
1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114
1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129
1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144
1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159
1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174
1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189
1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204
1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219
1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234
1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249
1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264
1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279
1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294
1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309
1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324
1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339
1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354
1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369
1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384
1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399
1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414
1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429
1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444
1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459
1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474
1475	1476	1477	1478	1479	14									

Cell: I9

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22

Comment:

Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40

Comment:

If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41

Comment:

If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48

Comment:

See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G82

Comment:

Vertebrates are:  
*Pimephales promelas*  
*Oncorhynchus mykiss*  
*Cyprinodon variegatus*

Cell: J62

Comment:

Invertebrates are:  
*Ceriodaphnia dubia*  
*Mysidopsis bahia*

Cell: C117

Comment: Vertebrates are:

*Pimephales promelas*  
*Cyprinodon variegatus*

Cell: M119

Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121

Comment:

If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TU<sub>a</sub>. The calculation is the same: 100/NOEC = TU<sub>c</sub> or 100/LC<sub>50</sub> = TU<sub>a</sub>.

Cell: C138

Comment: Invertebrates are:

*Ceriodaphnia dubia*  
*Mysidopsis bahia*

4/8/2010 4:54:05 PM

Facility = VA0000248 - Outfall 007

Chemical = Chronic Toxicity

Chronic averaging period = 4

WLAa = 6.6

WLAc = 22

Q.L. = 1

# samples/mo. = 1

# samples/wk. = 1

Summary of Statistics:

# observations = 5

Expected Value = 10

Variance = 36

C.V. = 0.6

97th percentile daily values = 24.3341

97th percentile 4 day average = 16.6379

97th percentile 30 day average= 12.0605

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 6.6

Average Weekly limit = 6.6

Average Monthly LImit = 6.6

The data are:

10

10

10

10

10

## Mixing Zone Predictions for

VA0000248 - 014

Effluent Flow = 0.048 MGD

Stream 7Q10 = 1.7 MGD

Stream 30Q10 = 1.9 MGD

Stream 1Q10 = 1.5 MGD

Stream slope = 0.001 ft/ft

Stream width = 10 ft

Bottom scale = .3

Channel scale = 1

---

### Mixing Zone Predictions @ 7Q10

Depth = .8058 ft

Length = 103.46 ft

Velocity = .3358 ft/sec

Residence Time = .0036 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

---

### Mixing Zone Predictions @ 30Q10

Depth = .8633 ft

Length = 97.05 ft

Velocity = .3492 ft/sec

Residence Time = .0032 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

---

### Mixing Zone Predictions @ 1Q10

Depth = .746 ft

Length = 111.11 ft

Velocity = .3212 ft/sec

Residence Time = .0961 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

---

**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 014

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

**Stream Information**

Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L
90% Temperature (Annual) =	23.3 deg C
90% Temperature (Wet season) =	13.8 deg C
90% Maximum pH =	8.22 SU
10% Maximum pH =	7.32 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	y
Trout Present Y/N? =	y
Early Life Stages Present Y/N? =	y

**Stream Flows**

1Q10 (Annual) =	1.5 MGD
7Q10 (Annual) =	1.7 MGD
30Q10 (Annual) =	1.9 MGD
1Q10 (Wet season) =	2.3 MGD
30Q10 (Wet season) =	4.4 MGD
30Q5 =	2.1 MGD
Harmonic Mean =	5.7 MGD

**Mixing Information**

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

**Effluent Information**

Mean Hardness (as CaCO <sub>3</sub> ) =	192 mg/L
90% Temp (Annual) =	23.3 deg C
90% Temp (Wet season) =	13.8 deg C
90% Maximum pH =	7.8 SU
10% Maximum pH =	7.1 SU
Discharge Flow =	0.048 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	3.0E+04	4.4E+04	--	--	6.7E+01	9.9E+01	--	--	3.0E+03	4.4E+03	--	--	3.0E+03	4.4E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	2.7E+02	4.2E+02	--	--	6.1E-01	9.3E-01	--	--	2.7E+01	4.2E+01	--	--	2.7E+01	4.2E+01
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	6.1E+01	3.0E+02	--	--	5.1E-02	2.5E-01	--	--	6.1E+00	3.0E+01	--	--	6.1E+00	3.0E+01
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	9.7E+01	--	5.9E-02	6.0E-02	7.5E-01	--	4.9E-05	5.0E-05	2.4E+01	--	5.9E-03	6.0E-03	2.4E+01	--	5.9E-03	6.0E-03
Ammonia-N (mg/l) (Yearly)	0	3.84E+00	1.01E+00	--	--	1.2E+02	4.1E+01	--	--	9.59E-01	2.53E-01	--	--	3.1E+01	1.0E+01	--	--	3.1E+01	1.0E+01	--	--
Ammonia-N (mg/l) (High Flow)	0	3.78E+00	1.76E+00	--	--	1.9E+02	1.6E+02	--	--	9.46E-01	4.39E-01	--	--	4.6E+01	4.1E+01	--	--	4.6E+01	4.1E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	3.7E+05	1.8E+06	--	--	6.3E+02	4.0E+03	--	--	3.7E+04	1.8E+05	--	--	3.7E+04	1.8E+05
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	2.5E+02	2.9E+04	--	--	5.6E-01	6.4E+01	--	--	2.5E+01	2.9E+03	--	--	2.5E+01	2.9E+03
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	1.1E+04	5.6E+03	4.3E+02	--	8.5E+01	3.8E+01	1.3E+00	--	2.7E+03	1.4E+03	4.4E+01	--	2.7E+03	1.4E+03	4.4E+01	--
Barium	0	--	--	2.0E+03	--	--	--	9.0E+04	--	--	--	2.0E+02	--	--	--	9.0E+03	--	--	--	9.0E+03	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	2.6E+03	6.1E+04	--	--	2.2E+00	5.1E+01	--	--	2.6E+02	6.1E+03	--	--	2.6E+02	6.1E+03
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	1.0E-01	2.4E-01	--	--	8.6E-05	2.0E-04	--	--	1.0E-02	2.4E-02	--	--	1.0E-02	2.4E-02
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	3.6E+01	6.3E+02	--	--	3.0E-02	5.3E-01	--	--	3.6E+00	6.3E+01	--	--	3.6E+00	6.3E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	1.4E+03	6.5E+04	--	--	6.3E+04	2.9E+06	--	--	1.4E+02	6.5E+03	--	--	6.3E+03	2.9E+05	--	--	6.3E+03	2.9E+05
Bis(2-Ethylhexyl) Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	1.4E+03	2.6E+03	--	--	1.2E+00	2.2E+00	--	--	1.4E+02	2.6E+02	--	--	1.4E+02	2.6E+02
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	5.1E+03	1.7E+05	--	--	4.3E+00	1.4E+02	--	--	5.1E+02	1.7E+04	--	--	5.1E+02	1.7E+04
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	6.7E+04	8.5E+04	--	--	1.5E+02	1.9E+02	--	--	6.7E+03	8.5E+03	--	--	6.7E+03	8.5E+03
Cadmium	0	3.1E+00	9.6E-01	5.0E+00	--	1.0E+02	3.5E+01	2.2E+02	--	7.8E-01	2.4E-01	5.0E-01	--	2.5E+01	8.8E+00	2.2E+01	--	2.5E+01	8.8E+00	2.2E+01	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	2.8E+02	1.9E+03	--	--	2.3E-01	1.6E+00	--	--	2.8E+01	1.9E+02	--	--	2.8E+01	1.9E+02
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	7.7E+01	1.6E-01	9.6E-01	9.7E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	1.9E+01	3.9E-02	9.6E-02	9.7E-02	1.9E+01	3.9E-02	9.6E-02	9.7E-02
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	2.7E+07	8.1E+06	1.1E+07	--	2.2E+05	6.3E+04	3.2E+04	--	6.9E+06	2.0E+06	1.1E+06	--	6.9E+06	2.0E+06	1.1E+06	--
TRC	0	1.9E+01	1.1E+01	--	--	6.1E+02	4.0E+02	--	--	4.8E+00	2.8E+00	--	--	1.5E+02	1.0E+02	--	--	1.5E+02	1.0E+02	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	5.8E+03	7.2E+04	--	--	1.3E+01	1.6E+02	--	--	5.8E+02	7.2E+03	--	--	5.8E+02	7.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	4.8E+02	1.6E+04	--	--	4.0E-01	1.3E+01	--	--	4.8E+01	1.6E+03	--	--	4.8E+01	1.6E+03
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.5E+04	4.9E+05	--	--	3.4E+01	1.1E+03	--	--	1.5E+03	4.9E+04	--	--	1.5E+03	4.9E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	4.5E+04	7.2E+04	--	--	1.0E+02	1.6E+02	--	--	4.5E+03	7.2E+03	--	--	4.5E+03	7.2E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	3.6E+03	6.7E+03	--	--	8.1E+00	1.5E+01	--	--	3.6E+02	6.7E+02	--	--	3.6E+02	6.7E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	2.7E+00	1.5E+00	--	--	2.1E-02	1.0E-02	--	--	6.7E-01	3.7E-01	--	--	6.7E-01	3.7E-01	--	--
Chromium III	0	4.8E+02	6.2E+01	--	--	1.6E+04	2.3E+03	--	--	1.2E+02	1.5E+01	--	--	3.9E+03	5.7E+02	--	--	3.9E+03	5.7E+02	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	5.2E+02	4.0E+02	--	--	4.0E+00	2.8E+00	--	--	1.3E+02	1.0E+02	--	--	1.3E+02	1.0E+02	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	4.5E+03	--	--	--	1.0E+01	--	--	--	4.5E+02	--	--	--	4.5E+02	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	3.8E-04	1.8E-03	--	--	4.6E-02	2.2E-01	--	--	4.6E-02	2.2E-01
Copper	0.65	1.1E+01	7.5E+00	1.3E+03	--	3.4E+02	2.5E+02	5.8E+04	--	3.3E+00	2.4E+00	1.3E+02	--	8.5E+01	6.3E+01	5.8E+03	--	8.5E+01	6.3E+01	5.8E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	7.1E+02	1.9E+02	6.3E+03	7.2E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	1.8E+02	4.7E+01	6.3E+02	7.2E+04	1.8E+02	4.7E+01	6.3E+02	7.2E+04
DDC <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	3.7E-01	3.7E-01	--	--	3.1E-04	3.1E-04	--	--	3.7E-02	3.7E-02	--	--	3.7E-02	3.7E-02
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	2.6E-01	2.6E-01	--	--	2.2E-04	2.2E-04	--	--	2.6E-02	2.6E-02	--	--	2.6E-02	2.6E-02
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	3.5E+01	3.6E-02	2.6E-01	2.6E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	8.9E+00	9.1E-03	2.6E-02	2.6E-02	8.9E+00	9.1E-03	2.6E-02	2.6E-02
Demeton	0	--	1.0E-01	--	--	--	--	3.6E+00	--	--	--	2.5E-02	--	--	--	9.1E-01	--	--	--	9.1E-01	--
Diazinon	0	1.7E-01	1.7E-01	--	--	5.5E+00	6.2E+00	--	--	4.3E-02	4.3E-02	--	--	1.4E+00	1.5E+00	--	--	1.4E+00	1.5E+00	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.9E+04	5.8E+04	--	--	4.2E+01	1.3E+02	--	--	1.9E+03	5.8E+03	--	--	1.9E+03	5.8E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.4E+04	4.3E+04	--	--	3.2E+01	9.6E+01	--	--	1.4E+03	4.3E+03	--	--	1.4E+03	4.3E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	2.8E+03	8.5E+03	--	--	6.3E+00	1.9E+01	--	--	2.8E+02	8.5E+02	--	--	2.8E+02	8.5E+02
3,3-Dichlorobenzidine <sup>b</sup>	0	--	--	2.1E-01	2.8E-01	--	--	2.5E+01	3.4E+01	--	--	2.1E-02	2.8E-02	--	--	2.5E+00	3.4E+00	--	--	2.5E+00	3.4E+00
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	6.6E+02	2.0E+04	--	--	5.5E-01	1.7E+01	--	--	6.6E+01	2.0E+03	--	--	6.6E+01	2.0E+03
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	4.6E+02	4.4E+04	--	--	3.8E-01	3.7E+01	--	--	4.6E+01	4.4E+03	--	--	4.6E+01	4.4E+03
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.5E+04	3.2E+05	--	--	3.3E+01	7.1E+02	--	--	1.5E+03	3.2E+04	--	--	1.5E+03	3.2E+04
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	6.3E+03	4.5E+05	--	--	1.4E+01	1.0E+03	--	--	6.3E+02	4.5E+04	--	--	6.3E+02	4.5E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	3.4E+03	1.3E+04	--	--	7.7E+00	2.9E+01	--	--	3.4E+02	1.3E+03	--	--	3.4E+02	1.3E+03
2,4-Dichlorophenoxyacetic acid (2,4-O)	0	--	--	1.0E+02	--	--	--	4.5E+03	--	--	--	1.0E+01	--	--	--	4.5E+02	--	--	--	4.5E+02	--
1,2-Dichloropropane <sup>b</sup>	0	--	--	5.0E+00	1.5E+02	--	--	6.0E+02	1.8E+04	--	--	5.0E-01	1.5E+01	--	--	6.0E+01	1.8E+03	--	--	6.0E+01	1.8E+03
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	4.1E+02	2.5E+04	--	--	3.4E-01	2.1E+01	--	--	4.1E+01	2.5E+03	--	--	4.1E+01	2.5E+03
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	7.7E+00	2.0E+00	6.2E-02	6.5E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	1.9E+00	5.1E-01	6.2E-03	6.5E-03	1.9E+00	5.1E-01	6.2E-03	6.5E-03
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	7.6E+05	2.0E+06	--	--	1.7E+03	4.4E+03	--	--	7.6E+04	2.0E+05	--	--	7.6E+04	2.0E+05
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	1.7E+04	3.8E+04	--	--	3.8E+01	8.5E+01	--	--	1.7E+03	3.8E+03	--	--	1.7E+03	3.8E+03
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.2E+07	4.9E+07	--	--	2.7E+04	1.1E+05	--	--	1.2E+06	4.9E+06	--	--	1.2E+06	4.9E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	9.0E+04	2.0E+05	--	--	2.0E+02	4.5E+02	--	--	9.0E+03	2.0E+04	--	--	9.0E+03	2.0E+04
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	3.1E+03	2.4E+05	--	--	6.9E+00	5.3E+02	--	--	3.1E+02	2.4E+04	--	--	3.1E+02	2.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	5.8E+02	1.3E+04	--	--	1.3E+00	2.8E+01	--	--	5.8E+01	1.3E+03	--	--	5.8E+01	1.3E+03
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	1.3E+02	4.1E+03	--	--	1.1E-01	3.4E+00	--	--	1.3E+01	4.1E+02	--	--	1.3E+01	4.1E+02
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	2.2E-06	2.3E-06	--	--	5.0E-09	5.1E-09	--	--	2.2E-07	2.3E-07	--	--	2.2E-07	2.3E-07
1,2-Diphenylhydrazine <sup>b</sup>	0	--	--	3.6E-01	2.0E+00	--	--	4.3E+01	2.4E+02	--	--	3.6E-02	2.0E-01	--	--	4.3E+00	2.4E+01	--	--	4.3E+00	2.4E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	7.1E+00	2.0E+00	2.8E+03	4.0E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.8E+00	5.1E-01	2.8E+02	4.0E+02	1.8E+00	5.1E-01	2.8E+02	4.0E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	7.1E+00	2.0E+00	2.8E+03	4.0E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.8E+00	5.1E-01	2.8E+02	4.0E+02	1.8E+00	5.1E-01	2.8E+02	4.0E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	7.1E+00	2.0E+00	--	--	5.5E-02	1.4E-02	--	--	1.8E+00	5.1E-01	--	--	1.8E+00	5.1E-01	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	2.8E+03	4.0E+03	--	--	6.2E+00	8.9E+00	--	--	2.8E+02	4.0E+02	--	--	2.8E+02	4.0E+02
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	2.8E+00	1.3E+00	2.6E+00	2.7E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	6.9E-01	3.3E-01	2.6E-01	6.9E-01	3.3E-01	2.6E-01	2.7E-01	
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.3E+01	1.3E+01	--	--	2.9E-02	3.0E-02	--	--	1.3E+00	1.3E+00	--	--	1.3E+00	1.3E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	2.4E+04	9.4E+04	--	--	5.3E+01	2.1E+02	--	--	2.4E+03	9.4E+03	--	--	2.4E+03	9.4E+03	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	5.8E+03	6.3E+03	--	--	1.3E+01	1.4E+01	--	--	5.8E+02	6.3E+02	--	--	5.8E+02	6.3E+02	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	4.9E+04	2.4E+05	--	--	1.1E+02	5.3E+02	--	--	4.9E+03	2.4E+04	--	--	4.9E+03	2.4E+04	
Foaming Agents	0	--	--	5.0E+02	--	--	--	2.2E+04	--	--	--	5.0E+01	--	--	--	2.2E+03	--	--	--	2.2E+03	--	
Guthion	0	--	1.0E-02	--	--	--	3.6E-01	--	--	--	2.5E-03	--	--	--	9.1E-02	--	--	--	9.1E-02	--	--	
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.7E+01	1.4E-01	9.5E-02	9.5E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	4.2E+00	3.5E-02	9.5E-03	9.5E-03	4.2E+00	3.5E-02	9.5E-03	9.5E-03	
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.7E+01	1.4E-01	4.7E-02	4.7E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	4.2E+00	3.5E-02	4.7E-03	4.7E-03	4.2E+00	3.5E-02	4.7E-03	4.7E-03	
Hexachlorobenzene <sup>e</sup>	0	--	--	2.8E-03	2.9E-03	--	--	3.4E-01	3.5E-01	--	--	2.8E-04	2.9E-04	--	--	3.4E-02	3.5E-02	--	--	3.4E-02	3.5E-02	
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	5.3E+02	2.2E+04	--	--	4.4E-01	1.8E+01	--	--	5.3E+01	2.2E+03	--	--	5.3E+01	2.2E+03	
Hexachlorocyclohexane																						
Alpha-BHC <sup>c</sup>	0	--	--	2.6E-02	4.9E-02	--	--	3.1E+00	5.9E+00	--	--	2.6E-03	4.9E-03	--	--	3.1E-01	5.9E-01	--	--	3.1E-01	5.9E-01	
Hexachlorocyclohexane Beta BHC <sup>c</sup>	0	--	--	9.1E-02	1.7E-01	--	--	1.1E+01	2.0E+01	--	--	9.1E-03	1.7E-02	--	--	1.1E+00	2.0E+00	--	--	1.1E+00	2.0E+00	
Hexachlorocyclohexane Gamma-BHC <sup>c</sup> (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	3.1E+01	--	1.2E+02	2.2E+02	2.4E-01	--	9.8E-02	1.8E-01	7.7E+00	--	1.2E+01	2.2E+01	7.7E+00	--	1.2E+01	2.2E+01	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.8E+03	4.9E+04	--	--	4.0E+00	1.1E+02	--	--	1.8E+02	4.9E+03	--	--	1.8E+02	4.9E+03	
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	1.7E+03	4.0E+03	--	--	1.4E+00	3.3E+00	--	--	1.7E+02	4.0E+02	--	--	1.7E+02	4.0E+02	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	7.3E+01	--	--	--	5.0E-01	--	--	--	1.8E+01	--	--	--	1.8E+01	--	--	
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	4.6E+00	2.2E+01	--	--	3.8E-03	1.8E-02	--	--	4.6E-01	2.2E+00	--	--	4.6E-01	2.2E+00	
Iron	0	--	--	3.0E+02	--	--	--	1.3E+04	--	--	--	3.0E+01	--	--	--	1.3E+03	--	--	--	1.3E+03	--	
Isophorone <sup>c</sup>	0	--	--	3.5E+02	9.6E+03	--	--	4.2E+04	1.1E+06	--	--	3.5E+01	9.6E+02	--	--	4.2E+03	1.1E+05	--	--	4.2E+03	1.1E+05	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	9.2E+01	1.0E+01	1.5E+01	--	3.0E+03	3.8E+02	6.7E+02	--	2.3E+01	2.6E+00	1.5E+00	--	7.4E+02	9.4E+01	6.7E+01	--	7.4E+02	9.4E+01	6.7E+01	--	
Maiathion	0	--	1.0E-01	--	--	--	3.6E+00	--	--	--	2.5E-02	--	--	--	9.1E-01	--	--	--	9.1E-01	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	1.6E+03	--	--	--	1.8E+01	--	--	--	1.7E+02	--	--	--	1.7E+02	--	
Mercury	0	1.4E+00	7.7E-01	--	--	4.5E+01	2.8E+01	--	--	3.5E-01	1.9E-01	--	--	1.1E+01	7.0E+00	--	--	1.1E+01	7.0E+00	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	2.1E+03	6.7E+04	--	--	4.7E+00	1.5E+02	--	--	2.1E+02	6.7E+03	--	--	2.1E+02	6.7E+03	
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	5.5E+03	7.1E+05	--	--	4.6E+00	5.9E+02	--	--	5.5E+02	7.1E+04	--	--	5.5E+02	7.1E+04	
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.1E+00	4.5E+03	--	--	7.5E-03	1.0E+01	--	--	2.7E-01	4.5E+02	--	--	2.7E-01	4.5E+02		
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.7E+01	6.1E+02	4.6E+03	4.9E+03	6.0E+02	2.7E+04	2.1E+05	3.9E+01	4.5E+00	6.1E+01	4.6E+02	1.2E+03	1.5E+02	2.7E+03	2.1E+04	1.2E+03	1.5E+02	2.7E+03	2.1E+04	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	4.1E+05	--	--	--	1.8E+03	--	--	--	4.2E+04	--	--	--	4.2E+04	--	
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	7.6E+02	3.1E+04	--	--	1.7E+00	6.9E+01	--	--	7.6E+01	3.1E+03	--	--	7.6E+01	3.1E+03	
N-Nitrosodimethylamine <sup>g</sup>	0	--	--	6.9E-03	3.0E+01	--	--	8.3E-01	3.6E+03	--	--	6.9E-04	3.0E+00	--	--	8.3E-02	3.6E+02	--	--	8.3E-02	3.6E+02	
N-Nitrosodiphenylamine <sup>g</sup>	0	--	--	3.3E+01	6.0E+01	--	--	4.0E+03	7.2E+03	--	--	3.3E+00	6.0E+00	--	--	4.0E+02	7.2E+02	--	--	4.0E+02	7.2E+02	
N-Nitrosodi-n-propylamine <sup>g</sup>	0	--	--	5.0E-02	5.1E+00	--	--	6.0E+00	6.1E+02	--	--	5.0E-03	5.1E-01	--	--	6.0E-01	6.1E+01	--	--	6.0E-01	6.1E+01	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	9.0E+02	2.4E+02	--	--	7.0E+00	1.7E+00	--	--	2.3E+02	6.0E+01	--	--	2.3E+02	6.0E+01	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	2.1E+00	4.7E-01	--	--	1.6E-02	3.3E-03	--	--	5.2E-01	1.2E-01	--	--	5.2E-01	1.2E-01	--	--	
PCB Total <sup>c</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	5.1E-01	7.7E-02	7.7E-02	--	3.5E-03	6.4E-05	6.4E-05	--	1.3E-01	7.7E-03	7.7E-03	--	1.3E-01	7.7E-03	7.7E-03	
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	3.8E+02	3.3E+02	3.2E+02	3.6E+03	3.0E+00	2.3E+00	2.7E-01	3.0E+00	9.6E+01	8.3E+01	3.2E+01	3.6E+02	9.6E+01	8.3E+01	3.2E+01	3.6E+02	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	4.5E+05	3.8E+07	--	--	1.0E+03	8.6E+04	--	--	4.5E+04	3.8E+06	--	--	4.5E+04	3.8E+06	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	3.7E+04	1.8E+05	--	--	8.3E+01	4.0E+02	--	--	3.7E+03	1.8E+04	--	--	3.7E+03	1.8E+04	
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	6.7E+02	--	--	--	1.5E+00	--	--	--	6.7E+01	--	--	--	6.7E+01	--	
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.8E+02	1.8E+02	--	--	4.0E-01	4.0E-01	--	--	1.8E+01	1.8E+01	--	--	1.8E+01	1.8E+01	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	2.2E+02	--	--	--	5.0E-01	--	--	--	2.2E+01	--	--	--	2.2E+01	--	
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.3E+03	--	--	--	3.0E+00	--	--	--	1.3E+02	--	--	--	1.3E+02	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	6.5E+02	1.8E+02	7.6E+03	1.9E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	1.6E+02	4.6E+01	7.6E+02	1.9E+04	1.6E+02	4.6E+01	7.6E+02	1.9E+04
Silver	0	2.4E+00	--	--	--	7.8E+01	--	--	--	6.1E-01	--	--	--	2.0E+01	--	--	--	2.0E+01	--	--	--
Sulfate	7870	--	--	2.5E+05	--	--	--	1.1E+07	--	--	--	3.2E+04	--	--	--	--	1.1E+06	--	--	1.1E+06	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	2.0E+02	4.8E+03	--	--	1.7E-01	4.0E+00	--	--	2.0E+01	4.8E+02	--	--	2.0E+01	4.8E+02
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	8.3E+02	4.0E+03	--	--	6.9E-01	3.3E+00	--	--	8.3E+01	4.0E+02	--	--	8.3E+01	4.0E+02
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.1E+01	2.1E+01	--	--	2.4E-02	4.7E-02	--	--	1.1E+00	2.1E+00	--	--	1.1E+00	2.1E+00
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	2.3E+04	2.7E+05	--	--	5.1E+01	6.0E+02	--	--	2.3E+03	2.7E+04	--	--	2.3E+03	2.7E+04
Total dissolved solids	0	--	--	5.0E+05	--	--	--	2.2E+07	--	--	--	5.0E+04	--	--	--	2.2E+05	--	--	--	2.2E+05	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	2.4E+01	7.3E-03	3.4E-01	3.4E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	5.9E+00	1.8E-03	3.4E-02	3.4E-02	5.9E+00	1.8E-03	3.4E-02	3.4E-02
Tributyltin	0	4.6E-01	7.2E-02	--	--	1.5E+01	2.6E+00	--	--	1.2E-01	1.8E-02	--	--	3.7E+00	6.6E-01	--	--	3.7E+00	6.6E-01	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.6E+03	3.1E+03	--	--	3.5E+00	7.0E+00	--	--	1.6E+02	3.1E+02	--	--	1.6E+02	3.1E+02
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	7.1E+02	1.9E+04	--	--	5.9E-01	1.6E+01	--	--	7.1E+01	1.9E+03	--	--	7.1E+01	1.9E+03
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	3.0E+03	3.6E+04	--	--	2.5E+00	3.0E+01	--	--	3.0E+02	3.6E+03	--	--	3.0E+02	3.6E+03
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	1.7E+03	2.9E+03	--	--	1.4E+00	2.4E+00	--	--	1.7E+02	2.9E+02	--	--	1.7E+02	2.9E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	2.2E+03	--	--	--	5.0E+00	--	--	--	2.2E+02	--	--	--	2.2E+02	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	3.0E+01	2.9E+03	--	--	2.5E-02	2.4E+00	--	--	3.0E+00	2.9E+02	--	--	3.0E+00	2.9E+02
Zinc	3.68	9.9E+01	9.9E+01	7.4E+03	2.6E+04	3.1E+03	3.5E+03	3.3E+05	1.2E+06	2.7E+01	2.7E+01	7.4E+02	2.6E+03	7.7E+02	8.7E+02	3.3E+04	1.2E+05	7.7E+02	8.7E+02	3.3E+04	1.2E+05

## Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.5E+01
Arsenic	4.4E+01
Barium	9.0E+03
Cadmium	5.3E+00
Chromium III	3.4E+02
Chromium VI	5.2E+01
Copper	3.4E+01
Iron	1.3E+03
Lead	5.7E+01
Manganese	1.7E+02
Mercury	4.2E+00
Nickel	9.1E+01
Selenium	2.7E+01
Silver	7.8E+00
Zinc	3.1E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for VA0000248 - 024

Effluent Flow = 0.003 MGD  
Stream 7Q10 = 576 MGD  
Stream 30Q10 = 666 MGD  
Stream 1Q10 = 463 MGD  
Stream slope = 0.001 ft/ft  
Stream width = 650 ft  
Bottom scale = 3  
Channel scale = 1

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Mixing Zone Predictions @ 7Q10

Depth = 2.0154 ft  
Length = 224040.35 ft  
Velocity = .6806 ft/sec  
Residence Time = 3.8098 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 52.5% of the 7Q10 is used.

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Mixing Zone Predictions @ 30Q10

Depth = 2.1993 ft  
Length = 208235.72 ft  
Velocity = .7212 ft/sec  
Residence Time = 3.342 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 59.84% of the 30Q10 is used.

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Mixing Zone Predictions @ 1Q10

Depth = 1.7674 ft  
Length = 250077.71 ft  
Velocity = .6239 ft/sec  
Residence Time = 111.3431 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .9% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 024

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	463 MGD	Annual - 1Q10 Mix =	0.9 %	Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	576 MGD	- 7Q10 Mix =	52.5 %	90% Temp (Annual) =	23.3 deg C
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	666 MGD	- 30Q10 Mix =	59.84 %	90% Temp (Wet season) =	13.8 deg C
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	545 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.22 SU
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1097 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7.32 SU
Tier Designation (1 or 2) =	2	30Q5 =	747 MGD			Discharge Flow =	0.003 MGD
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1562 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	8.7E+02	9.9E+02	--	--	1.7E+08	2.5E+08	--	--	8.7E+01	9.9E+01	--	--	1.7E+07	2.5E+07	--	--	1.7E+07	2.5E+07
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	1.5E+08	2.3E+08	--	--	6.1E-01	9.3E-01	--	--	1.5E+05	2.3E+05	--	--	1.5E+05	2.3E+05
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	2.7E+05	1.3E+06	--	--	5.1E-02	2.5E-01	--	--	2.7E+04	1.3E+05	--	--	2.7E+04	1.3E+05
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	4.2E+03	--	2.6E+02	2.6E+02	7.5E-01	--	4.9E-05	5.0E-05	1.2E+05	--	2.6E+01	2.6E+01	4.2E+03	--	2.6E+01	2.6E+01
Ammonia-N (mg/l) (Yearly)	0	3.68E+00	9.86E-01	--	--	5.1E+03	1.3E+05	--	--	9.20E-01	2.46E-01	--	--	1.4E+05	5.5E+04	--	--	5.1E+03	5.5E+04	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	6.7E+05	6.3E+05	--	--	9.20E-01	4.34E-01	--	--	1.7E+05	1.6E+05	--	--	1.7E+05	1.6E+05	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	2.1E+09	1.0E+10	--	--	8.3E+02	4.0E+03	--	--	2.1E+08	1.0E+09	--	--	2.1E+08	1.0E+09
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	1.4E+06	1.6E+08	--	--	5.6E-01	6.4E+01	--	--	1.4E+05	1.6E+07	--	--	1.4E+05	1.6E+07
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	4.7E+05	1.5E+07	2.4E+06	--	8.5E+01	3.8E+01	1.3E+00	--	1.3E+07	7.2E+06	2.4E+05	--	4.7E+05	7.2E+06	2.4E+05	--
Barium	0	--	--	2.0E+03	--	--	--	5.0E+08	--	--	--	2.0E+02	--	--	--	5.0E+07	--	--	--	5.0E+07	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	1.1E+07	2.7E+08	--	--	2.2E+00	5.1E+01	--	--	1.1E+06	2.7E+07	--	--	1.1E+06	2.7E+07
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	4.5E+02	1.0E+03	--	--	8.6E-05	2.0E-04	--	--	4.5E+01	1.0E+02	--	--	4.5E+01	1.0E+02
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	1.6E+05	2.8E+06	--	--	3.0E-02	5.3E-01	--	--	1.6E+04	2.8E+05	--	--	1.6E+04	2.8E+05
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	3.5E+08	1.6E+10	--	--	1.4E+02	6.5E+03	--	--	3.5E+07	1.6E+09	--	--	3.5E+07	1.6E+09
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	6.2E+06	1.1E+07	--	--	1.2E+00	2.2E+00	--	--	6.2E+05	1.1E+06	--	--	6.2E+05	1.1E+06
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	2.2E+07	7.3E+08	--	--	4.3E+00	1.4E+02	--	--	2.2E+06	7.3E+07	--	--	2.2E+06	7.3E+07
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	3.7E+08	4.7E+08	--	--	1.5E+02	1.9E+02	--	--	3.7E+07	4.7E+07	--	--	3.7E+07	4.7E+07
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	4.1E+03	9.4E+04	1.2E+06	--	7.4E-01	2.3E-01	5.0E-01	--	1.1E+05	4.5E+04	1.2E+05	--	4.1E+03	4.5E+04	1.2E+05	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	1.2E+06	8.3E+06	--	--	2.3E-01	1.6E+00	--	--	1.2E+05	8.3E+05	--	--	1.2E+05	8.3E+05
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	6.1E-03	3.3E+03	4.3E+02	4.2E+03	4.2E+03	6.0E-01	1.1E-03	8.0E-04	8.1E-04	9.3E+04	2.1E+02	4.2E+02	4.2E+02	3.3E+03	2.1E+02	4.2E+02	4.2E+02
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	1.2E+09	2.2E+10	6.0E+10	--	2.2E+05	6.3E+04	3.2E+04	--	3.3E+10	1.1E+10	6.0E+09	--	1.2E+09	1.1E+10	6.0E+09	--
TRC	0	1.9E+01	1.1E+01	--	--	2.6E+04	1.1E+06	--	--	4.8E+00	2.8E+00	--	--	7.3E+05	5.3E+05	--	--	2.6E+04	5.3E+05	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	3.2E+07	4.0E+08	--	--	1.3E+01	1.6E+02	--	--	3.2E+06	4.0E+07	--	--	3.2E+06	4.0E+07

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>E</sup>	0	--	--	4.0E+00	1.3E+02	--	--	2.1E+06	6.8E+07	--	--	4.0E-01	1.3E+01	--	--	2.1E+05	6.8E+06	--	--	2.1E+05	6.8E+06
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	8.5E+07	2.7E+09	--	--	3.4E+01	1.1E+03	--	--	8.5E+06	2.7E+08	--	--	8.5E+06	2.7E+08
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	2.5E+08	4.0E+08	--	--	1.0E+02	1.6E+02	--	--	2.5E+07	4.0E+07	--	--	2.5E+07	4.0E+07
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	2.0E+07	3.7E+07	--	--	8.1E+00	1.5E+01	--	--	2.0E+06	3.7E+06	--	--	2.0E+06	3.7E+06
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.2E+02	4.1E+03	--	--	2.1E-02	1.0E-02	--	--	3.2E+03	2.0E+03	--	--	1.2E+02	2.0E+03	--	--
Chromium III	0	4.6E+02	6.0E+01	--	--	6.5E+05	6.1E+06	--	--	1.2E+02	1.5E+01	--	--	1.8E+07	2.9E+06	--	--	6.5E+05	2.9E+06	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	2.2E+04	1.1E+06	--	--	4.0E+00	2.8E+00	--	--	6.2E+05	5.3E+05	--	--	2.2E+04	5.3E+05	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	2.5E+07	--	--	--	1.0E+01	--	--	--	2.5E+06	--	--	--	2.5E+06	--
Chrysene <sup>C</sup>	0	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	3.8E-04	1.8E-03	--	--	2.0E+02	9.4E+02	--	--	2.0E+02	9.4E+02
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	1.4E+04	6.6E+05	3.2E+08	--	3.1E+00	2.3E+00	1.3E+02	--	3.9E+05	3.2E+05	3.2E+07	--	1.4E+04	3.2E+05	3.2E+07	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	3.1E+04	5.2E+05	3.5E+07	4.0E+09	5.5E+00	1.3E+00	1.4E+01	1.6E+03	8.5E+05	2.5E+05	3.5E+06	4.0E+08	3.1E+04	2.5E+05	3.5E+06	4.0E+08
DDD <sup>C</sup>	0	--	--	3.1E-03	3.1E-03	--	--	1.6E+03	1.6E+03	--	--	3.1E-04	3.1E-04	--	--	1.6E+02	1.6E+02	--	--	1.6E+02	1.6E+02
DDE <sup>C</sup>	0	--	--	2.2E-03	2.2E-03	--	--	1.1E+03	1.1E+03	--	--	2.2E-04	2.2E-04	--	--	1.1E+02	1.1E+02	--	--	1.1E+02	1.1E+02
DDT <sup>C</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.5E+03	1.0E+02	1.1E+03	1.1E+03	2.8E-01	2.5E-04	2.2E-04	2.2E-04	4.2E+04	4.8E+01	1.1E+02	1.1E+02	1.5E+03	4.8E+01	1.1E+02	1.1E+02
Demeton	0	--	--	1.0E-01	--	--	--	1.0E+04	--	--	--	2.5E-02	--	--	--	4.8E+03	--	--	--	4.8E+03	--
Diazinon	0	1.7E-01	1.7E-01	--	--	2.4E+02	1.7E+04	--	--	4.3E-02	4.3E-02	--	--	6.6E+03	8.2E+03	--	--	2.4E+02	8.2E+03	--	--
Dibenzo(a,h)anthracene <sup>C</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.0E+08	3.2E+08	--	--	4.2E+01	1.3E+02	--	--	1.0E+07	3.2E+07	--	--	1.0E+07	3.2E+07
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	8.0E+07	2.4E+08	--	--	3.2E+01	9.6E+01	--	--	8.0E+06	2.4E+07	--	--	8.0E+06	2.4E+07
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	1.6E+07	4.7E+07	--	--	6.3E+00	1.9E+01	--	--	1.6E+06	4.7E+06	--	--	1.6E+06	4.7E+06
3,3-Dichlorobenzidine <sup>E</sup>	0	--	--	2.1E-01	2.8E-01	--	--	1.1E+05	1.5E+05	--	--	2.1E-02	2.8E-02	--	--	1.1E+04	1.5E+04	--	--	1.1E+04	1.5E+04
Dichlorobromomethane <sup>C</sup>	0	--	--	5.5E+00	1.7E+02	--	--	2.9E+06	8.9E+07	--	--	5.5E-01	1.7E+01	--	--	2.9E+05	8.9E+06	--	--	2.9E+05	8.9E+06
1,2-Dichloroethane <sup>C</sup>	0	--	--	3.8E+00	3.7E+02	--	--	2.0E+06	1.9E+08	--	--	3.8E-01	3.7E+01	--	--	2.0E+05	1.9E+07	--	--	2.0E+05	1.9E+07
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	8.2E+07	1.8E+09	--	--	3.3E+01	7.1E+02	--	--	8.2E+06	1.8E+08	--	--	8.2E+06	1.8E+08
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	3.5E+07	2.5E+09	--	--	1.4E+01	1.0E+03	--	--	3.5E+06	2.5E+08	--	--	3.5E+06	2.5E+08
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.9E+07	7.2E+07	--	--	7.7E+00	2.9E+01	--	--	1.9E+06	7.2E+06	--	--	1.9E+06	7.2E+06
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	2.5E+07	--	--	--	1.0E+01	--	--	--	2.5E+06	--	--	--	2.5E+06	--
1,2-Dichloropropane <sup>E</sup>	0	--	--	5.0E+00	1.5E+02	--	--	2.6E+06	7.8E+07	--	--	5.0E-01	1.5E+01	--	--	2.6E+05	7.8E+06	--	--	2.6E+05	7.8E+06
1,3-Dichloropropene <sup>C</sup>	0	--	--	3.4E+00	2.1E+02	--	--	1.8E+06	1.1E+08	--	--	3.4E-01	2.1E+01	--	--	1.8E+05	1.1E+07	--	--	1.8E+05	1.1E+07
Dieldrin <sup>C</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	3.3E+02	5.6E+03	2.7E+02	2.8E+02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	9.3E+03	2.7E+03	2.7E+01	2.8E+01	3.3E+02	2.7E+03	2.7E+01	2.8E+01
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	4.2E+09	1.1E+10	--	--	1.7E+03	4.4E+03	--	--	4.2E+08	1.1E+09	--	--	4.2E+08	1.1E+09
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	9.5E+07	2.1E+08	--	--	3.8E+01	8.5E+01	--	--	9.5E+06	2.1E+07	--	--	9.5E+06	2.1E+07
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	6.7E+10	2.7E+11	--	--	2.7E+04	1.1E+05	--	--	6.7E+09	2.7E+10	--	--	6.7E+09	2.7E+10
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	5.0E+08	1.1E+09	--	--	2.0E+02	4.5E+02	--	--	5.0E+07	1.1E+08	--	--	5.0E+07	1.1E+08
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	1.7E+07	1.3E+09	--	--	6.9E+00	5.3E+02	--	--	1.7E+06	1.3E+08	--	--	1.7E+06	1.3E+08
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	3.2E+06	7.0E+07	--	--	1.3E+00	2.8E+01	--	--	3.2E+05	7.0E+06	--	--	3.2E+05	7.0E+06
2,4-Dinitrotoluene <sup>C</sup>	0	--	--	1.1E+00	3.4E+01	--	--	5.7E+05	1.8E+07	--	--	1.1E-01	3.4E+00	--	--	5.7E+04	1.8E+06	--	--	5.7E+04	1.8E+06
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	1.2E-02	1.3E-02	--	--	5.0E-09	5.1E-09	--	--	1.2E-03	1.3E-03	--	--	1.2E-03	1.3E-03
1,2-Diphenylhydrazine <sup>E</sup>	0	--	--	3.6E-01	2.0E+00	--	--	1.9E+05	1.0E+06	--	--	3.6E-02	2.0E-01	--	--	1.9E+04	1.0E+05	--	--	1.9E+04	1.0E+05
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.1E+02	5.6E+03	1.5E+07	2.2E+07	5.5E-02	1.4E-02	6.2E+00	8.9E+00	8.5E+03	2.7E+03	1.5E+06	2.2E+06	3.1E+02	2.7E+03	1.5E+06	2.2E+06
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	3.1E+02	5.6E+03	1.5E+07	2.2E+07	5.5E-02	1.4E-02	6.2E+00	8.9E+00	8.5E+03	2.7E+03	1.5E+06	2.2E+06	3.1E+02	2.7E+03	1.5E+06	2.2E+06
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	3.1E+02	5.6E+03	--	--	5.5E-02	1.4E-02	--	--	8.5E+03	2.7E+03	--	--	3.1E+02	2.7E+03	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	1.5E+07	2.2E+07	--	--	6.2E+00	8.9E+00	--	--	1.5E+06	2.2E+06	--	--	1.5E+06	2.2E+06
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.2E+02	3.6E+03	1.5E+04	1.5E+04	2.2E-02	9.0E-03	5.9E-03	6.0E-03	3.3E+03	1.7E+03	1.5E+03	1.5E+03	1.2E+02	1.7E+03	1.5E+03	1.5E+03
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	7.2E+04	7.5E+04	--	--	2.9E-02	3.0E-02	--	--	7.2E+03	7.5E+03	--	--	7.2E+03	7.5E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	1.3E+08	5.2E+08	--	--	5.3E+01	2.1E+02	--	--	1.3E+07	5.2E+07	--	--	1.3E+07	5.2E+07	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	3.2E+07	3.5E+07	--	--	1.3E+01	1.4E+01	--	--	3.2E+06	3.5E+06	--	--	3.2E+06	3.5E+06	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	2.7E+08	1.3E+09	--	--	1.1E+02	5.3E+02	--	--	2.7E+07	1.3E+08	--	--	2.7E+07	1.3E+08	
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.2E+08	--	--	--	5.0E+01	--	--	--	1.2E+07	--	--	--	1.2E+07	--	
Guthion	0	--	--	1.0E-02	--	--	--	1.0E+03	--	--	--	2.5E-03	--	--	--	4.8E+02	--	--	--	4.8E+02	--	
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	7.2E+02	3.8E+02	4.1E+02	4.1E+02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	2.0E+04	1.8E+02	4.1E+01	4.1E+01	7.2E+02	1.8E+02	4.1E+01	4.1E+01	
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	7.2E+02	3.8E+02	2.0E+02	2.0E+02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	2.0E+04	1.8E+02	2.0E+01	2.0E+01	7.2E+02	1.8E+02	2.0E+01	2.0E+01	
Hexachlorobenzene <sup>e</sup>	0	--	--	2.8E-03	2.9E-03	--	--	1.5E+03	1.5E+03	--	--	2.8E-04	2.9E-04	--	--	1.5E+02	1.5E+02	--	--	1.5E+02	1.5E+02	
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	2.3E+06	9.4E+07	--	--	4.4E-01	1.8E+01	--	--	2.3E+05	9.4E+05	--	--	2.3E+05	9.4E+05	
Hexachlorocyclohexane																						
Alpha-BHC <sup>c</sup>	0	--	--	2.6E-02	4.9E-02	--	--	1.4E+04	2.6E+04	--	--	2.6E-03	4.9E-03	--	--	1.4E+03	2.6E+03	--	--	1.4E+03	2.6E+03	
Hexachlorocyclohexane Beta-BHC <sup>c</sup>	0	--	--	9.1E-02	1.7E-01	--	--	4.7E+04	8.9E+04	--	--	9.1E-03	1.7E-02	--	--	4.7E+03	8.9E+03	--	--	4.7E+03	8.9E+03	
Hexachlorocyclohexane Gamma-BHC <sup>c</sup> (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.3E+03	--	5.1E+05	9.4E+05	2.4E-01	--	9.8E-02	1.8E-01	3.7E+04	--	5.1E+04	9.4E+04	1.3E+03	--	5.1E+04	9.4E+04	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.0E+07	2.7E+08	--	--	4.0E+00	1.1E+02	--	--	1.0E+06	2.7E+07	--	--	1.0E+06	2.7E+07	
Hexachloroethane <sup>g</sup>	0	--	--	1.4E+01	3.3E+01	--	--	7.3E+06	1.7E+07	--	--	1.4E+00	3.3E+00	--	--	7.3E+05	1.7E+06	--	--	7.3E+05	1.7E+06	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.0E+05	--	--	--	5.0E-01	--	--	--	9.6E+04	--	--	--	9.6E+04	--	--	
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.0E+04	9.4E+04	--	--	3.8E-03	1.8E-02	--	--	2.0E+03	9.4E+03	--	--	2.0E+03	9.4E+03	
Iron	0	--	--	3.0E+02	--	--	--	7.5E+07	--	--	--	3.0E+01	--	--	--	7.5E+06	--	--	--	7.5E+06	--	
Isophorone <sup>f</sup>	0	--	--	3.5E+02	9.5E+03	--	--	1.8E+08	5.0E+09	--	--	3.5E+01	9.5E+02	--	--	1.8E+07	5.0E+08	--	--	1.8E+07	5.0E+08	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	8.7E+01	9.8E+00	1.5E+01	--	1.2E+05	9.9E+05	3.7E+06	--	2.2E+01	2.5E+00	1.5E+00	--	3.3E+06	4.7E+05	3.7E+05	--	1.2E+05	4.7E+05	3.7E+05	--	
Malathion	0	--	1.0E-01	--	--	--	1.0E+04	--	--	--	2.5E-02	--	--	--	4.8E+03	--	--	--	4.8E+03	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	8.9E+06	--	--	--	1.8E+01	--	--	--	8.9E+05	--	--	--	8.9E+05	--	
Mercury	0	1.4E+00	7.7E-01	--	--	1.9E+03	7.8E+04	--	--	3.5E-01	1.9E-01	--	--	5.4E+04	3.7E+04	--	--	1.9E+03	3.7E+04	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	1.2E+07	3.7E+08	--	--	4.7E+00	1.5E+02	--	--	1.2E+06	3.7E+07	--	--	1.2E+06	3.7E+07	
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	2.4E+07	3.1E+09	--	--	4.6E+00	5.9E+02	--	--	2.4E+06	3.1E+08	--	--	2.4E+06	3.1E+08	
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.0E+03	2.5E+07	--	--	7.5E-03	1.0E+01	--	--	1.4E+03	2.5E+06	--	--	1.4E+03	2.5E+06		
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	2.0E+05	1.6E+06	1.5E+08	1.1E+09	3.7E+01	4.4E+00	6.1E+01	4.6E+02	5.7E+06	7.7E+05	1.5E+07	1.1E+08	2.0E+05	7.7E+05	1.5E+07	1.1E+08	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	2.3E+09	--	--	--	1.8E+03	--	--	--	2.3E+08	--	--	--	2.3E+08	--	
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	4.2E+06	1.7E+08	--	--	1.7E+00	6.9E+01	--	--	4.2E+05	1.7E+07	--	--	4.2E+05	1.7E+07	
N-Nitrosodimethylamine	0	--	--	6.9E-03	3.0E+01	--	--	3.6E+03	1.6E+07	--	--	6.9E-04	3.0E+00	--	--	3.6E+02	1.6E+06	--	--	3.6E+02	1.6E+06	
N-Nitrosodiphenylamine	0	--	--	3.3E+01	6.0E+01	--	--	1.7E+07	3.1E+07	--	--	3.3E+00	6.0E+00	--	--	1.7E+06	3.1E+06	--	--	1.7E+06	3.1E+06	
N-Nitrosodi-n-propylamine	0	--	--	5.0E-02	5.1E+00	--	--	2.6E+04	2.7E+06	--	--	5.0E-03	5.1E-01	--	--	2.6E+03	2.7E+05	--	--	2.6E+03	2.7E+05	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.9E+04	6.7E+05	--	--	7.0E+00	1.7E+00	--	--	1.1E+06	3.2E+05	--	--	3.9E+04	3.2E+05	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	9.0E+01	1.3E+03	--	--	1.6E-02	3.3E-03	--	--	2.5E+03	6.2E+02	--	--	9.0E+01	6.2E+02	--	--	
PCB Total <sup>f</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.4E+03	3.3E+02	3.3E+02	--	3.5E-03	6.4E-05	6.4E-05	--	6.7E+02	3.3E+01	3.3E+01	--	6.7E+02	3.3E+01	3.3E+01	
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	1.7E+04	9.3E+05	1.4E+06	1.6E+07	3.0E+00	2.3E+00	2.7E-01	3.0E+00	4.6E+05	4.4E+05	1.4E+05	1.6E+06	1.7E+04	4.4E+05	1.4E+05	1.6E+06	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	2.5E+09	2.1E+11	--	--	1.0E+03	8.6E+04	--	--	2.5E+08	2.1E+10	--	--	2.5E+08	2.1E+10	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	2.1E+08	1.0E+09	--	--	8.3E+01	4.0E+02	--	--	2.1E+07	1.0E+08	--	--	2.1E+07	1.0E+08	
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	3.7E+06	--	--	--	1.5E+00	--	--	--	3.7E+05	--	--	--	3.7E+05	--	
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.0E+06	1.0E+06	--	--	4.0E-01	4.0E-01	--	--	1.0E+05	1.0E+05	--	--	1.0E+05	1.0E+05	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	1.2E+06	--	--	--	5.0E-01	--	--	--	1.2E+05	--	--	--	1.2E+05	--	
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	7.5E+06	--	--	--	3.0E+00	--	--	--	7.5E+05	--	--	--	7.5E+05	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.8E+04	5.0E+05	4.2E+07	1.0E+09	5.0E+00	1.3E+00	1.7E+01	4.2E+02	7.7E+05	2.4E+05	4.2E+06	1.0E+08	2.8E+04	2.4E+05	4.2E+06	1.0E+08
Silver	0	2.3E+00	--	--	--	3.1E+03	--	--	--	5.6E-01	--	--	--	8.7E+04	--	--	--	3.1E+03	--	--	--
Sulfate	7870	--	--	2.5E+05	--	--	--	6.0E+10	--	--	--	--	--	--	--	6.0E+09	--	--	--	6.0E+09	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	8.9E+05	2.1E+07	--	--	1.7E-01	4.0E+00	--	--	8.9E+04	2.1E+06	--	--	8.9E+04	2.1E+06
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	3.6E+06	1.7E+07	--	--	6.9E-01	3.3E+00	--	--	3.6E+05	1.7E+06	--	--	3.6E+05	1.7E+06
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	6.0E+04	1.2E+05	--	--	2.4E-02	4.7E-02	--	--	6.0E+03	1.2E+04	--	--	6.0E+03	1.2E+04
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	1.3E+08	1.5E+09	--	--	5.1E+01	6.0E+02	--	--	1.3E+07	1.5E+08	--	--	1.3E+07	1.5E+08
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.2E+11	--	--	--	5.0E+04	--	--	--	1.2E+10	--	--	--	1.2E+10	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.0E+03	2.0E+01	1.5E+03	1.5E+03	1.8E-01	5.0E-05	2.8E-04	2.8E-04	2.8E+04	9.6E+00	1.5E+02	1.5E+02	1.0E+03	9.6E+00	1.5E+02	1.5E+02
Tributyltin	0	4.6E-01	7.2E-02	--	--	6.4E+02	7.3E+03	--	--	1.2E-01	1.8E-02	--	--	1.8E+04	3.5E+03	--	--	6.4E+02	3.5E+03	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	8.7E+06	1.7E+07	--	--	3.5E+00	7.0E+00	--	--	8.7E+05	1.7E+06	--	--	8.7E+05	1.7E+06
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	3.1E+06	8.3E+07	--	--	5.9E-01	1.6E+01	--	--	3.1E+05	8.3E+06	--	--	3.1E+05	8.3E+06
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	1.3E+07	1.6E+08	--	--	2.5E+00	3.0E+01	--	--	1.3E+06	1.6E+07	--	--	1.3E+06	1.6E+07
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	7.3E+06	1.2E+07	--	--	1.4E+00	2.4E+00	--	--	7.3E+05	1.2E+06	--	--	7.3E+05	1.2E+06
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.2E+07	--	--	--	5.0E+00	--	--	--	1.2E+06	--	--	--	1.2E+06	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	1.3E+05	1.2E+07	--	--	2.5E-02	2.4E+00	--	--	1.3E+04	1.2E+06	--	--	1.3E+04	1.2E+06
Zinc	3.68	9.5E+01	9.6E+01	7.4E+03	2.6E+04	1.3E+05	9.3E+06	1.8E+09	6.5E+09	2.6E+01	2.7E+01	7.4E+02	2.6E+03	3.5E+06	4.4E+06	1.8E+08	6.5E+08	1.3E+05	4.4E+06	1.8E+08	6.5E+08

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.4E+05
Arsenic	1.9E+05
Barium	5.0E+07
Cadmium	1.6E+03
Chromium III	2.6E+05
Chromium VI	8.9E+03
Copper	5.6E+03
Iron	7.5E+06
Lead	4.8E+04
Manganese	8.9E+05
Mercury	7.8E+02
Nickel	8.2E+04
Selenium	1.1E+04
Silver	1.3E+03
Zinc	5.1E+04

Note: do not use QL's lower than the minimum QL's provided in agency guidance

## Mixing Zone Predictions for

VA0000248 - 026

Effluent Flow = 1.0 MGD  
Stream 7Q10 = 559 MGD  
Stream 30Q10 = 646 MGD  
Stream 1Q10 = 449 MGD  
Stream slope = 0.001 ft/ft  
Stream width = 600 ft  
Bottom scale = 3  
Channel scale = 1

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### Mixing Zone Predictions @ 7Q10

Depth = 2.0797 ft  
Length = 185875.96 ft  
Velocity = .6947 ft/sec  
Residence Time = 3.0968 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 64.58% of the 7Q10 is used.

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### Mixing Zone Predictions @ 30Q10

Depth = 2.2685 ft  
Length = 172819.87 ft  
Velocity = .7358 ft/sec  
Residence Time = 2.7183 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 73.57% of the 30Q10 is used.

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### Mixing Zone Predictions @ 1Q10

Depth = 1.8234 ft  
Length = 207529.48 ft  
Velocity = .6367 ft/sec  
Residence Time = 90.5362 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.1% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 026

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	1.1 %			Mean Hardness (as CaCO <sub>3</sub> ) =	98 mg/L		
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	64.58 %			90% Temp (Annual) =	23.3 deg C		
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	648 MGD	- 30Q10 Mix =	73.57 %			90% Temp (Wet season) =	13.8 deg C		
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	529 MGD	Wet Season - 1Q10 Mix =	100 %			90% Maximum pH =	7.3 SU		
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %			10% Maximum pH =	6.5 SU		
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD					Discharge Flow =	1 MGD		
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	4.9E+05	7.2E+05	--	--	6.7E+01	9.9E+01	--	--	4.9E+04	7.2E+04	--	--	4.9E+04	7.2E+04
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	4.4E+03	6.8E+03	--	--	6.1E-01	9.3E-01	--	--	4.4E+02	6.8E+02	--	--	4.4E+02	6.8E+02
Acrylonitrile <sup>f</sup>	0	--	--	5.1E-01	2.5E+00	--	--	7.8E+02	3.8E+03	--	--	5.1E-02	2.5E-01	--	--	7.8E+01	3.8E+02	--	--	7.8E+01	3.8E+02
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	1.8E+01	--	7.5E-01	7.6E-01	7.5E-01	--	4.9E-05	5.0E-05	3.4E+02	--	7.5E-02	7.6E-02	1.8E+01	--	7.5E-02	7.6E-02
Ammonia-N (mg/l) (Yearly)	0	7.13E+00	9.96E-01	--	--	4.2E+01	4.7E+02	--	--	9.32E-01	2.48E-01	--	--	4.2E+02	1.6E+02	--	--	4.2E+01	1.6E+02	--	--
Ammonia-N (mg/l) (High Flow)	0	3.72E+00	1.74E+00	--	--	2.0E+03	1.9E+03	--	--	9.31E-01	4.36E-01	--	--	4.9E+02	4.7E+02	--	--	4.9E+02	4.7E+02	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	6.0E+06	2.9E+07	--	--	8.3E+02	4.0E+03	--	--	6.0E+05	2.9E+06	--	--	6.0E+05	2.9E+06
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	4.1E+03	4.7E+05	--	--	5.6E-01	6.4E+01	--	--	4.1E+02	4.7E+04	--	--	4.1E+02	4.7E+04
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	2.0E+03	5.4E+04	7.0E+03	--	8.5E+01	3.8E+01	1.3E+00	--	3.8E+04	2.1E+04	7.0E+02	--	2.0E+03	2.1E+04	7.0E+02	--
Banum	0	--	--	2.0E+03	--	--	--	1.5E+06	--	--	--	2.0E+02	--	--	--	1.5E+05	--	--	--	1.5E+05	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	3.3E+04	7.8E+05	--	--	2.2E+00	5.1E+01	--	--	3.3E+03	7.8E+04	--	--	3.3E+03	7.8E+04
Benzidine <sup>f</sup>	0	--	--	8.6E-04	2.0E-03	--	--	1.3E+00	3.0E+00	--	--	8.6E-05	2.0E-04	--	--	1.3E-01	3.0E-01	--	--	1.3E-01	3.0E-01
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01
Bis2-Chloroethyl Ether <sup>f</sup>	0	--	--	3.0E-01	5.3E+00	--	--	4.6E+02	8.1E+03	--	--	3.0E-02	5.3E-01	--	--	4.6E+01	8.1E+02	--	--	4.6E+01	8.1E+02
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.0E+06	4.7E+07	--	--	1.4E+02	6.5E+03	--	--	1.0E+05	4.7E+06	--	--	1.0E+05	4.7E+06
Bis 2-Ethylhexyl Phthalate <sup>f</sup>	0	--	--	1.2E+01	2.2E+01	--	--	1.8E+04	3.3E+04	--	--	1.2E+00	2.2E+00	--	--	1.8E+03	3.3E+03	--	--	1.8E+03	3.3E+03
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	6.5E+04	2.1E+06	--	--	4.3E+00	1.4E+02	--	--	6.5E+03	2.1E+05	--	--	6.5E+03	2.1E+05
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.1E+06	1.4E+06	--	--	1.5E+02	1.9E+02	--	--	1.1E+05	1.4E+05	--	--	1.1E+05	1.4E+05
Cadmium	0	3.1E+00	9.3E-01	5.0E+00	--	1.8E+01	3.4E+02	3.6E+03	--	7.4E-01	2.3E-01	5.0E-01	--	3.3E+02	1.3E+02	3.6E+02	--	1.8E+01	1.3E+02	3.6E+02	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	3.5E+03	2.4E+04	--	--	2.3E-01	1.6E+00	--	--	3.5E+02	2.4E+03	--	--	3.5E+02	2.4E+03
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.4E+01	1.6E+00	1.2E+01	1.2E+01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	2.7E+02	6.0E-01	1.2E+00	1.4E+01	6.0E-01	1.2E+00	1.2E+00	1.2E+00
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	5.1E+06	8.0E+07	1.8E+08	--	2.2E+05	6.3E+04	3.2E+04	--	9.6E+07	3.1E+07	1.8E+07	--	5.1E+06	3.1E+07	1.8E+07	--
TRC	0	1.9E+01	1.1E+01	--	--	1.1E+02	4.0E+03	--	--	4.8E+00	2.8E+00	--	--	2.1E+03	1.5E+03	--	--	1.1E+02	1.5E+03	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	9.5E+04	1.2E+06	--	--	1.3E+01	1.6E+02	--	--	9.5E+03	1.2E+05	--	--	9.5E+03	1.2E+05

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	6.1E+03	2.0E+05	--	--	4.0E-01	1.3E+01	--	--	6.1E+02	2.0E+04	--	--	6.1E+02	2.0E+04		
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	2.5E+05	8.0E+06	--	--	3.4E+01	1.1E+03	--	--	2.5E+04	8.0E+05	--	--	2.5E+04	8.0E+05		
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	7.3E+05	1.2E+06	--	--	1.0E+02	1.6E+02	--	--	7.3E+04	1.2E+05	--	--	7.3E+04	1.2E+05		
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	5.9E+04	1.1E+05	--	--	8.1E+00	1.5E+01	--	--	5.9E+03	1.1E+04	--	--	5.9E+03	1.1E+04		
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	4.9E-01	1.5E+01	--	--	2.1E-02	1.0E-02	--	--	9.3E+00	5.7E+00	--	--	4.9E-01	5.7E+00	--	--		
Chromium III	0	4.8E+02	6.1E+01	--	--	2.9E+03	2.2E+04	--	--	1.2E+02	1.5E+01	--	--	5.2E+04	8.5E+03	--	--	2.9E+03	8.5E+03	--	--		
Chromium VI	0	1.6E+01	1.1E+01	--	--	9.5E+01	4.0E+03	--	--	4.0E+00	2.8E+00	--	--	1.8E+03	1.5E+03	--	--	9.5E+01	1.5E+03	--	--		
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	7.3E+04	--	--	--	1.0E+01	--	--	--	7.3E+03	--	--	--	7.3E+03	--		
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.6E-02	--	--	5.8E+00	2.7E+01	--	--	3.8E-04	1.8E-03	--	--	5.8E-01	2.7E+00	--	--	5.8E-01	2.7E+00		
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	6.3E+01	2.4E+03	9.4E+05	--	3.1E+00	2.3E+00	1.3E+02	--	1.1E+03	9.2E+02	9.4E+04	--	6.3E+01	9.2E+02	9.4E+04	--		
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.3E+02	1.9E+03	1.0E+05	1.2E+07	5.5E+00	1.3E+00	1.4E+01	1.6E+03	2.5E+03	7.3E+02	1.0E+04	1.2E+06	1.3E+02	7.3E+02	1.0E+04	1.2E+06		
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	4.7E+00	4.7E+00	--	--	3.1E-04	3.1E-04	--	--	4.7E-01	4.7E-01	--	--	4.7E-01	4.7E-01		
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	3.3E+00	3.3E+00	--	--	2.2E-04	2.2E-04	--	--	3.3E-01	3.3E-01	--	--	3.3E-01	3.3E-01		
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	6.5E+00	3.6E-01	3.3E+00	3.3E+00	2.8E-01	2.5E-04	2.2E-04	2.2E-04	1.2E+02	1.4E-01	3.3E-01	3.3E-01	6.5E+00	1.4E-01	3.3E-01	3.3E-01		
Demeton	0	--	--	1.0E-01	--	--	--	3.6E+01	--	--	--	2.6E-02	--	--	--	1.4E+01	--	--	--	1.4E+01	--		
Diazinon	0	1.7E-01	1.7E-01	--	--	1.0E+00	6.2E+01	--	--	4.3E-02	4.3E-02	--	--	1.9E+01	2.4E+01	--	--	1.0E+00	2.4E+01	--	--		
Dibenzo(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01		
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	3.1E+05	9.5E+05	--	--	4.2E+01	1.3E+02	--	--	3.1E+04	9.5E+04	--	--	3.1E+04	9.5E+04		
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	2.3E+05	7.0E+05	--	--	3.2E+01	9.6E+01	--	--	2.3E+04	7.0E+04	--	--	2.3E+04	7.0E+04		
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	4.6E+04	1.4E+05	--	--	6.3E+00	1.9E+01	--	--	4.6E+03	1.4E+04	--	--	4.6E+03	1.4E+04		
3,3-Dichlorobenzidine <sup>f</sup>	0	--	--	2.1E-01	2.8E-01	--	--	3.2E+02	4.3E+02	--	--	2.1E-02	2.8E-02	--	--	3.2E+01	4.3E+01	--	--	3.2E+01	4.3E+01		
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	8.4E+03	2.6E+05	--	--	5.5E-01	1.7E+01	--	--	8.4E+02	2.6E+04	--	--	8.4E+02	2.6E+04		
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	5.8E+03	5.6E+05	--	--	3.8E-01	3.7E+01	--	--	5.8E+02	5.6E+04	--	--	5.8E+02	5.6E+04		
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	2.4E+05	5.2E+06	--	--	3.3E+01	7.1E+02	--	--	2.4E+04	5.2E+05	--	--	2.4E+04	5.2E+05		
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.0E+05	7.3E+06	--	--	1.4E+01	1.0E+03	--	--	1.0E+04	7.3E+05	--	--	1.0E+04	7.3E+05		
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	5.6E+04	2.1E+05	--	--	7.7E+00	2.9E+01	--	--	5.6E+03	2.1E+04	--	--	5.6E+03	2.1E+04		
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	7.3E+04	--	--	--	1.0E+01	--	--	--	7.3E+03	--	--	--	7.3E+03	--		
1,2-Dichloropropane <sup>c</sup>	0	--	--	5.0E+00	1.5E+02	--	--	7.6E+03	2.3E+05	--	--	5.0E-01	1.5E+01	--	--	7.6E+02	2.3E+04	--	--	7.6E+02	2.3E+04		
1,3-Dichloreopropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	5.2E+03	3.2E+05	--	--	3.4E-01	2.1E+01	--	--	5.2E+02	3.2E+04	--	--	5.2E+02	3.2E+04		
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.4E+00	2.0E+01	7.9E-01	8.2E-01	6.0E-02	1.4E-02	5.2E-05	5.4E-05	2.7E+01	7.8E+00	7.9E-02	8.2E-02	1.4E+00	7.8E+00	7.9E-02	8.2E-02		
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.2E+07	3.2E+07	--	--	1.7E+03	4.4E+03	--	--	1.2E+06	3.2E+06	--	--	1.2E+06	3.2E+06		
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	2.8E+05	6.2E+05	--	--	3.8E+01	8.5E+01	--	--	2.8E+04	6.2E+04	--	--	2.8E+04	6.2E+04		
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.0E+08	8.0E+08	--	--	2.7E+04	1.1E+05	--	--	2.0E+07	8.0E+07	--	--	2.0E+07	8.0E+07		
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	1.5E+06	3.3E+06	--	--	2.0E+02	4.5E+02	--	--	1.5E+05	3.3E+05	--	--	1.5E+05	3.3E+05		
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	5.0E+04	3.9E+06	--	--	6.9E+00	5.3E+02	--	--	5.0E+03	3.9E+05	--	--	5.0E+03	3.9E+05		
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.6E+02	--	--	9.5E+03	2.0E+05	--	--	1.3E+00	2.6E+01	--	--	9.5E+02	2.0E+04	--	--	9.5E+02	2.0E+04		
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	1.7E+03	5.2E+04	--	--	1.1E-01	3.4E+00	--	--	1.7E+02	5.2E+03	--	--	1.7E+02	5.2E+03		
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	3.6E-05	3.7E-05	--	--	5.0E-09	5.1E-09	--	--	3.6E-06	3.7E-06	--	--	3.6E-06	3.7E-06		
1,2-Diphenylhydrazine <sup>f</sup>	0	--	--	3.6E-01	2.0E+00	--	--	5.5E+02	3.0E+03	--	--	3.6E-02	2.0E-01	--	--	5.5E+01	3.0E+02	--	--	5.5E+01	3.0E+02		
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+00	2.0E+01	4.5E+04	6.5E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	2.5E+01	7.8E+00	4.5E+03	6.5E+03	1.3E+00	7.8E+00	4.5E+03	6.5E+03		
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+00	2.0E+01	4.5E+04	6.5E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	2.5E+01	7.8E+00	4.5E+03	6.5E+03	1.3E+00	7.8E+00	4.5E+03	6.5E+03		
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.3E+00	2.0E+01	--	--	5.5E-02	1.4E-02	--	--	2.5E+01	7.8E+00	--	--	1.3E+00	7.8E+00	--	--		
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	4.5E+04	6.5E+04	--	--	6.2E+00	8.9E+00	--	--	4.5E+03	6.5E+03	--	--	4.5E+03	6.5E+03		
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	5.1E-01	1.3E+01	4.3E+01	4.4E+01	2.2E-02	9.0E-03	5.9E-03	6.0E-03	9.7E+00	5.0E+00	4.3E+00	4.4E+00	5.1E-01	5.0E+00	4.3E+00	4.4E+00		
Endrin Aldehyde	0	--	--	--	--	2.9E-01	3.0E-01	--	--	2.1E+02	2.2E+02	--	--	2.9E-02	3.0E-02	--	--	2.1E+01	2.2E+01	--	--	2.1E+01	2.2E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	3.9E+05	1.5E+06	--	--	5.3E+01	2.1E+02	--	--	3.9E+04	1.5E+05	--	--	3.9E+04	1.5E+05	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	9.5E+04	1.0E+05	--	--	1.3E+01	1.4E+01	--	--	9.5E+03	1.0E+04	--	--	9.5E+03	1.0E+04	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	8.0E+05	3.9E+06	--	--	1.1E+02	5.3E+02	--	--	8.0E+04	3.9E+05	--	--	8.0E+04	3.9E+05	
Foaming Agents	0	--	--	5.0E+02	--	--	--	3.6E+05	--	--	--	5.0E+01	--	--	--	3.6E+04	--	--	--	3.6E+04	--	
Guthion	0	--	1.0E-02	--	--	--	3.6E+00	--	--	--	2.5E-03	--	--	--	1.4E+00	--	--	--	1.4E+00	--	--	
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	3.1E+00	1.4E+00	1.2E+00	1.2E+00	1.3E-01	9.5E-04	7.9E-05	7.9E-05	5.9E+01	5.3E-01	1.2E-01	1.2E-01	3.1E+00	5.3E-01	1.2E-01	1.2E-01	
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	3.1E+00	1.4E+00	5.9E-01	5.9E-01	1.3E-01	9.5E-04	3.9E-05	3.9E-05	5.9E+01	5.3E-01	5.9E-02	5.9E-02	3.1E+00	5.3E-01	5.9E-02	5.9E-02	
Hexachlorobenzene <sup>f</sup>	0	--	--	2.8E-03	2.9E-03	--	--	4.3E+00	4.4E+00	--	--	2.8E-04	2.9E-04	--	--	4.3E-01	4.4E-01	--	--	4.3E-01	4.4E-01	
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	6.7E+03	2.7E+05	--	--	4.4E-01	1.8E+01	--	--	6.7E+02	2.7E+04	--	--	6.7E+02	2.7E+04	
Hexachlorocyclohexane																						
Alpha-BHC <sup>c</sup>	0	--	--	2.6E-02	4.9E-02	--	--	4.0E+01	7.5E+01	--	--	2.6E-03	4.9E-03	--	--	4.0E+00	7.5E+00	--	--	4.0E+00	7.5E+00	
Hexachlorocyclohexane Beta BHC <sup>c</sup>	0	--	--	9.1E-02	1.7E-01	--	--	1.4E+02	2.6E+02	--	--	9.1E-03	1.7E-02	--	--	1.4E+01	2.6E+01	--	--	1.4E+01	2.6E+01	
Hexachlorocyclohexane Gamma-BHC <sup>c</sup> (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	5.6E+00	--	1.5E+03	2.7E+03	2.4E-01	--	9.8E-02	1.8E-01	1.1E+02	--	1.5E+02	2.7E+02	5.6E+00	--	1.5E+02	2.7E+02	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	2.9E+04	8.0E+05	--	--	4.0E+00	1.1E+02	--	--	2.9E+03	8.0E+04	--	--	2.9E+03	8.0E+04	
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	2.1E+04	5.0E+04	--	--	1.4E+00	3.3E+00	--	--	2.1E+03	5.0E+03	--	--	2.1E+03	5.0E+03	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	7.2E+02	--	--	--	5.0E-01	--	--	--	2.8E+02	--	--	--	2.8E+02	--	--	
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	5.8E+01	2.7E+02	--	--	3.8E-03	1.8E-02	--	--	5.8E+00	2.7E+01	--	--	5.8E+00	2.7E+01	
Iron	0	--	--	3.0E+02	--	--	--	2.2E+05	--	--	--	3.0E+01	--	--	--	2.2E+04	--	--	--	2.2E+04	--	--
Isophorone <sup>c</sup>	0	--	--	3.5E+02	9.6E+03	--	--	5.3E+05	1.5E+07	--	--	3.5E+01	9.6E+02	--	--	5.3E+04	1.5E+06	--	--	5.3E+04	1.5E+06	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	9.1E+01	9.9E+00	1.5E+01	--	5.4E+02	3.6E+03	1.1E+04	--	2.2E+01	2.5E+00	1.5E+00	--	9.8E+03	1.4E+03	1.1E+03	--	5.4E+02	1.4E+03	1.1E+03	--	
Malathion	0	--	1.0E-01	--	--	--	3.6E+01	--	--	--	2.5E-02	--	--	--	1.4E+01	--	--	--	1.4E+01	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	2.6E+04	--	--	--	1.8E+01	--	--	--	2.6E+03	--	--	--	2.6E+03	--	--
Mercury	0	1.4E+00	7.7E-01	--	--	8.3E+00	2.8E+02	--	--	3.5E-01	1.9E-01	--	--	1.6E+02	1.1E+02	--	--	8.3E+00	1.1E+02	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	3.4E+04	1.1E+06	--	--	4.7E+00	1.5E+02	--	--	3.4E+03	1.1E+05	--	--	3.4E+03	1.1E+05	
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	7.0E+04	9.0E+06	--	--	4.6E+00	5.9E+02	--	--	7.0E+03	9.0E+05	--	--	7.0E+03	9.0E+05	
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.1E+01	7.3E+04	--	--	7.5E-03	1.0E+01	--	--	4.2E+00	7.3E+03	--	--	4.2E+00	7.3E+03	--	
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	9.1E+02	5.8E+03	4.4E+05	3.3E+06	3.7E+01	4.4E+00	6.1E+01	4.6E+02	1.7E+04	2.2E+03	4.4E+04	3.3E+05	9.1E+02	2.2E+03	4.4E+04	3.3E+05	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	6.6E+06	--	--	--	1.8E+03	--	--	--	6.6E+05	--	--	--	6.6E+05	--	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.2E+04	5.0E+05	--	--	1.7E+00	6.9E+01	--	--	1.2E+03	5.0E+04	--	--	1.2E+03	5.0E+04	
N-Nitrosodimethylamine <sup>f</sup>	0	--	--	6.9E-03	3.0E+01	--	--	1.0E+01	4.6E+04	--	--	6.9E-04	3.0E+00	--	--	1.0E+00	4.6E+03	--	--	1.0E+00	4.6E+03	
N-Nitrosodiphenylamine <sup>f</sup>	0	--	--	3.3E+01	6.0E+01	--	--	5.0E+04	9.1E+04	--	--	3.3E+00	6.0E+00	--	--	5.0E+03	9.1E+03	--	--	5.0E+03	9.1E+03	
N-Nitrosodi-n-propylamine <sup>f</sup>	0	--	--	5.0E-02	5.1E+00	--	--	7.6E+01	7.8E+03	--	--	5.0E-03	5.1E-01	--	--	7.6E+00	7.8E+02	--	--	7.6E+00	7.8E+02	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.7E+02	2.4E+03	--	--	7.0E+00	1.7E+00	--	--	3.2E+03	9.2E+02	--	--	1.7E+02	9.2E+02	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	3.9E-01	4.7E+00	--	--	1.6E-02	3.3E-03	--	--	7.3E+00	1.8E+00	--	--	3.9E-01	1.8E+00	--	--	
PCB Total <sup>c</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	5.1E+00	9.7E-01	9.7E-01	--	3.5E-03	6.4E-05	6.4E-05	--	2.0E+00	9.7E-02	9.7E-02	--	2.0E+00	9.7E-02	9.7E-02	
Pentachlorophenol <sup>c</sup>	0	9.0E+00	9.2E+00	2.7E+00	3.0E+01	5.3E+01	3.3E+03	4.1E+03	4.6E+04	3.0E+00	2.3E+00	2.7E-01	3.0E+00	1.3E+03	1.3E+03	4.1E+02	4.6E+03	5.3E+01	1.3E+03	4.1E+02	4.6E+03	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	7.3E+06	6.3E+08	--	--	1.0E+03	8.6E+04	--	--	7.3E+05	6.3E+07	--	--	7.3E+05	6.3E+07	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	6.0E+05	2.9E+06	--	--	8.3E+01	4.0E+02	--	--	6.0E+04	2.9E+05	--	--	6.0E+04	2.9E+05	
Radionuclides																						
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.1E+04	--	--	--	1.5E+00	--	--	--	1.1E+03	--	--	--	1.1E+03	--	--
Beta and Photon Activity (rem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	2.9E+03	2.9E+03	--	--	4.0E-01	4.0E-01	--	--	2.9E+02	2.9E+02	--	--	2.9E+02	2.9E+02	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	3.6E+03	--	--	--	5.0E-01	--	--	--	3.6E+02	--	--	--	3.6E+02	--	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	2.2E+04	--	--	--	3.0E+00	--	--	--	2.2E+03	--	--	--	2.2E+03	--	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.2E+02	1.8E+03	1.2E+05	3.1E+06	5.0E+00	1.3E+00	1.7E+01	4.2E+02	2.3E+03	7.0E+02	1.2E+04	3.1E+05	1.2E+02	7.0E+02	1.2E+04	3.1E+05	
Silver	0	2.4E+00	--	--	--	1.4E+01	--	--	--	5.6E-01	--	--	--	2.5E+02	--	--	--	1.4E+01	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	1.8E+08	--	--	--	3.2E+04	--	--	--	1.8E+07	--	--	--	1.8E+07	--	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	2.6E+03	6.1E+04	--	--	1.7E-01	4.0E+00	--	--	2.6E+02	6.1E+03	--	--	2.6E+02	6.1E+03	
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	1.0E+04	5.0E+04	--	--	6.9E-01	3.3E+00	--	--	1.0E+03	5.0E+03	--	--	1.0E+03	5.0E+03	
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.7E+02	3.4E+02	--	--	2.4E-02	4.7E-02	--	--	1.7E+01	3.4E+01	--	--	1.7E+01	3.4E+01	
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	3.7E+05	4.4E+06	--	--	5.1E+01	6.0E+02	--	--	3.7E+04	4.4E+05	--	--	3.7E+04	4.4E+05	
Total dissolved solids	0	--	--	5.0E+05	--	--	--	3.6E+08	--	--	--	5.0E+04	--	--	--	3.6E+07	--	--	--	3.6E+07	--	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	4.3E+00	7.2E-02	4.3E+00	4.3E+00	1.8E-01	5.0E-05	2.8E-04	2.8E-04	8.2E+01	2.8E-02	4.3E-01	4.3E-01	2.8E-02	4.3E-01	4.3E-01	4.3E-01	
Tributyltin	0	4.6E-01	7.2E-02	--	--	2.7E+00	2.6E+01	--	--	1.2E-01	1.8E-02	--	--	5.2E+01	1.0E+01	--	--	2.7E+00	1.0E+01	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	2.5E+04	5.1E+04	--	--	3.5E+00	7.0E+00	--	--	2.5E+03	5.1E+03	--	--	2.5E+03	5.1E+03	
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	9.0E+03	2.4E+05	--	--	5.9E-01	1.6E+01	--	--	9.0E+02	2.4E+04	--	--	9.0E+02	2.4E+04	
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	3.8E+04	4.6E+05	--	--	2.5E+00	3.0E+01	--	--	3.8E+03	4.6E+04	--	--	3.8E+03	4.6E+04	
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	2.1E+04	3.7E+04	--	--	1.4E+00	2.4E+00	--	--	2.1E+03	3.7E+03	--	--	2.1E+03	3.7E+03	
2-(2,4,5-Trichlorophenoxy)propanoic acid (Silvex)	0	--	--	5.0E+01	--	--	--	3.6E+04	--	--	--	5.0E+00	--	--	--	3.6E+03	--	--	--	3.6E+03	--	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	3.8E+02	3.7E+04	--	--	2.5E-02	2.4E+00	--	--	3.8E+01	3.7E+03	--	--	3.8E+01	3.7E+03	
Zinc	3.68	9.8E+01	9.6E+01	7.4E+03	2.6E+04	5.7E+02	3.3E+04	5.4E+06	1.9E+07	2.7E+01	2.7E+01	7.4E+02	2.6E+03	1.0E+04	1.3E+04	5.4E+05	1.9E+06	5.7E+02	1.3E+04	5.4E+05	1.9E+06	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	4.1E-02
Arsenic	7.0E+02
Barium	1.5E+05
Cadmium	7.4E+00
Chromium III	1.1E+03
Chromium VI	3.8E+01
Copper	2.5E+01
Iron	2.2E+04
Lead	2.2E+02
Manganese	2.6E+03
Mercury	3.3E+00
Nickel	3.6E+02
Selenium	4.8E+01
Silver	5.7E+00
Zinc	2.3E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 2:15:46 PM

Facility = VA0000248 - 026

Chemical = Iron, Total

Chronic averaging period = 4

WLAA =

WLAC = 22000

Q.L. = 10

# samples/mo. = 1

# samples/wk. = 1

Summary of Statistics:

# observations = 1

Expected Value = 150

Variance = 8100

C.V. = 0.6

97th percentile daily values = 365.012

97th percentile 4 day average = 249.568

97th percentile 30 day average= 180.907

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

150

4/12/2010 2:16:16 PM

Facility = VA0000248 - 026  
Chemical = Ammonia  
Chronic averaging period = 30  
WLAA = 42  
WLAC = 160  
Q.L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

**Summary of Statistics:**

# observations = 1  
Expected Value = 13  
Variance = 60.84  
C.V. = 0.6  
97th percentile daily values = 31.6344  
97th percentile 4 day average = 21.6292  
97th percentile 30 day average= 15.6786  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

## Mixing Zone Predictions for

VA0000248 - 028

Effluent Flow = 0.07 MGD

Stream 7Q10 = 576 MGD

Stream 30Q10 = 666 MGD

Stream 1Q10 = 463 MGD

Stream slope = 0.001 ft/ft

Stream width = 760 ft

Bottom scale = 3

Channel scale = 1

---

### Mixing Zone Predictions @ 7Q10

Depth = 1.8341 ft

Length = 331623.02 ft

Velocity = .6398 ft/sec

Residence Time = 5.9996 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 33.34% of the 7Q10 is used.

---

### Mixing Zone Predictions @ 30Q10

Depth = 2.0013 ft

Length = 308270.63 ft

Velocity = .6779 ft/sec

Residence Time = 5.2634 days

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 38.% of the 30Q10 is used.

---

### Mixing Zone Predictions @ 1Q10

Depth = 1.6085 ft

Length = 370096.57 ft

Velocity = .5864 ft/sec

Residence Time = 175.3194 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .57% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 028

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	463 MGD	Annual - 1Q10 Mix =	0.57 %	Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	576 MGD	- 7Q10 Mix =	33.34 %	90% Temp (Annual) =	23.3 deg C
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	666 MGD	- 30Q10 Mix =	38 %	90% Temp (Wet season) =	13.8 deg C
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	545 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.22 SU
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1097 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7.32 SU
Tier Designation (1 or 2) =	2	30Q5 =	747 MGD			Discharge Flow =	0.07 MGD
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	7.2E+06	1.1E+07	--	--	6.7E+01	9.9E+01	--	--	7.2E+05	1.1E+06	--	--	7.2E+05	1.1E+06
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.5E+04	9.9E+04	--	--	6.1E-01	9.3E-01	--	--	6.5E+03	9.9E+03	--	--	6.5E+03	9.9E+03
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	1.1E+04	5.4E+04	--	--	5.1E-02	2.5E-01	--	--	1.1E+03	5.4E+03	--	--	1.1E+03	5.4E+03
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	1.2E+02	--	1.1E+01	1.1E+01	7.5E-01	--	4.9E-05	5.0E-05	5.0E+03	--	1.1E+00	1.1E+00	1.2E+02	--	1.1E+00	1.1E+00
Ammonia-N (mg/l) (Yearly)	0	3.68E+00	9.86E-01	--	--	1.4E+02	3.6E+03	--	--	9.20E-01	2.46E-01	--	--	6.1E+03	2.3E+03	--	--	1.4E+02	2.3E+03	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	2.9E+04	2.7E+04	--	--	9.20E-01	4.34E-01	--	--	7.2E+03	6.8E+03	--	--	7.2E+03	6.8E+03	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	8.9E+07	4.3E+08	--	--	8.3E+02	4.0E+03	--	--	8.9E+06	4.3E+07	--	--	8.9E+06	4.3E+07
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	6.0E+04	6.8E+06	--	--	5.6E-01	6.4E+01	--	--	6.0E+03	6.8E+05	--	--	6.0E+03	6.8E+05
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	1.3E+04	4.1E+05	1.0E+05	--	8.5E+01	3.8E+01	1.3E+00	--	5.6E+05	3.1E+05	1.0E+04	--	1.3E+04	3.1E+05	1.0E+04	--
Barium	0	--	--	2.0E+03	--	--	--	2.1E+07	--	--	--	2.0E+02	--	--	--	2.1E+06	--	--	--	2.1E+06	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	4.8E+05	1.1E+07	--	--	2.2E+00	5.1E+01	--	--	4.8E+04	1.1E+06	--	--	4.8E+04	1.1E+06
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	1.9E+01	4.3E+01	--	--	8.6E-05	2.0E-04	--	--	1.9E+00	4.3E+00	--	--	1.9E+00	4.3E+00
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	6.5E+03	1.2E+05	--	--	3.0E-02	5.3E-01	--	--	6.5E+02	1.2E+04	--	--	6.5E+02	1.2E+04
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.5E+07	6.9E+08	--	--	1.4E+02	6.5E+03	--	--	1.5E+06	6.9E+07	--	--	1.5E+06	6.9E+07
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	2.8E+05	4.8E+05	--	--	1.2E+00	2.2E+00	--	--	2.6E+04	4.8E+04	--	--	2.6E+04	4.8E+04
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	9.3E+05	3.0E+07	--	--	4.3E+00	1.4E+02	--	--	9.3E+04	3.0E+06	--	--	9.3E+04	3.0E+06
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.6E+07	2.0E+07	--	--	1.5E+02	1.9E+02	--	--	1.6E+05	2.0E+06	--	--	1.6E+05	2.0E+06
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	1.1E+02	2.6E+03	5.3E+04	--	7.4E-01	2.3E-01	5.0E-01	--	4.9E+03	1.9E+03	5.3E+03	--	1.1E+02	1.9E+03	5.3E+03	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	5.0E+04	3.5E+05	--	--	2.3E-01	1.6E+00	--	--	5.0E+03	3.5E+04	--	--	5.0E+03	3.5E+04
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	9.3E+01	1.2E+01	1.7E+02	1.8E+02	6.0E-01	1.1E-03	8.0E-04	8.1E-04	4.0E+03	8.8E+00	1.7E+01	1.8E+01	9.3E+01	8.8E+00	1.7E+01	1.8E+01
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	3.3E+07	6.1E+08	2.6E+09	--	2.2E+05	6.3E+04	3.2E+04	--	1.4E+09	4.6E+08	2.6E+08	--	3.3E+07	4.6E+08	2.6E+08	--
TRC	0	1.9E+01	1.1E+01	--	--	7.4E+02	3.0E+04	--	--	4.8E+00	2.8E+00	--	--	3.1E+04	2.3E+04	--	--	7.4E+02	2.3E+04	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.4E+06	1.7E+07	--	--	1.3E+01	1.6E+02	--	--	1.4E+05	1.7E+06	--	--	1.4E+05	1.7E+06

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane	0	--	--	4.0E+00	1.3E+02	--	--	8.7E+04	2.8E+06	--	--	4.0E-01	1.3E+01	--	--	8.7E+03	2.8E+05	--	--	8.7E+03	2.8E+05
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.6E+06	1.2E+08	--	--	3.4E+01	1.1E+03	--	--	3.6E+05	1.2E+07	--	--	3.6E+05	1.2E+07
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.1E+07	1.7E+07	--	--	1.0E+02	1.6E+02	--	--	1.1E+06	1.7E+06	--	--	1.1E+06	1.7E+06
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.6E+05	1.6E+06	--	--	8.1E+00	1.5E+01	--	--	8.6E+04	1.6E+05	--	--	8.6E+04	1.6E+05
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	3.2E+00	1.1E+02	--	--	2.1E-02	1.0E-02	--	--	1.4E+02	8.4E+01	--	--	3.2E+00	8.4E+01	--	--
Chromium III	0	4.6E+02	6.0E+01	--	--	1.8E+04	1.7E+05	--	--	1.2E+02	1.5E+01	--	--	7.7E+05	1.2E+05	--	--	1.8E+04	1.2E+05	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	6.2E+02	3.0E+04	--	--	4.0E+00	2.8E+00	--	--	2.6E+04	2.3E+04	--	--	6.2E+02	2.3E+04	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	1.1E+06	--	--	--	1.0E+01	--	--	--	1.1E+05	--	--	--	1.1E+05	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	3.8E-04	1.8E-03	--	--	8.3E+00	3.9E+01	--	--	8.3E+00	3.9E+01
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	3.9E+02	1.8E+04	1.4E+07	--	3.1E+00	2.3E+00	1.3E+02	--	1.7E+04	1.4E+04	1.4E+06	--	3.9E+02	1.4E+04	1.4E+06	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	8.5E+02	1.4E+04	1.5E+06	1.7E+08	5.5E+00	1.3E+00	1.4E+01	1.6E+03	3.6E+04	1.1E+04	1.5E+05	1.7E+07	8.5E+02	1.1E+04	1.5E+05	1.7E+07
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	6.7E+01	6.7E+01	--	--	3.1E-04	3.1E-04	--	--	6.7E+00	6.7E+00	--	--	6.7E+00	6.7E+00
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	4.8E+01	4.8E+01	--	--	2.2E-04	2.2E-04	--	--	4.8E+00	4.8E+00	--	--	4.8E+00	4.8E+00
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	4.3E+01	2.7E+00	4.8E+01	4.8E+01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	1.8E+03	2.1E+00	4.8E+00	4.8E+00	4.3E+01	2.1E+00	4.8E+00	4.8E+00
Demeton	0	--	--	1.0E-01	--	--	--	2.7E+02	--	--	--	2.5E-02	--	--	--	2.1E+02	--	--	--	2.1E+02	--
Diazinon	0	1.7E-01	1.7E-01	--	--	6.6E+00	4.7E+02	--	--	4.3E-02	4.3E-02	--	--	2.8E+02	3.5E+02	--	--	6.6E+00	3.5E+02	--	--
Dibenzo(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.5E+06	1.4E+07	--	--	4.2E+01	1.3E+02	--	--	4.5E+05	1.4E+06	--	--	4.5E+05	1.4E+06
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.4E+06	1.0E+07	--	--	3.2E+01	9.6E+01	--	--	3.4E+05	1.0E+06	--	--	3.4E+05	1.0E+06
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.7E+05	2.0E+06	--	--	6.3E+00	1.9E+01	--	--	6.7E+04	2.0E+05	--	--	6.7E+04	2.0E+05
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	2.1E-01	2.8E-01	--	--	4.6E+03	6.1E+03	--	--	2.1E-02	2.8E-02	--	--	4.6E+02	6.1E+02	--	--	4.6E+02	6.1E+02
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	1.2E+05	3.7E+06	--	--	5.5E-01	1.7E+01	--	--	1.2E+04	3.7E+05	--	--	1.2E+04	3.7E+05
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	8.3E+04	8.0E+06	--	--	3.8E-01	3.7E+01	--	--	8.3E+03	8.0E+05	--	--	8.3E+03	8.0E+05
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.5E+06	7.6E+07	--	--	3.3E+01	7.1E+02	--	--	3.5E+05	7.6E+06	--	--	3.5E+05	7.6E+06
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.5E+06	1.1E+08	--	--	1.4E+01	1.0E+03	--	--	1.5E+05	1.1E+07	--	--	1.5E+05	1.1E+07
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	8.2E+05	3.1E+06	--	--	7.7E+00	2.9E+01	--	--	8.2E+04	3.1E+05	--	--	8.2E+04	3.1E+05
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.1E+06	--	--	--	1.0E+01	--	--	--	1.1E+05	--	--	--	1.1E+05	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	5.0E+00	1.5E+02	--	--	1.1E+05	3.3E+06	--	--	5.0E-01	1.5E+01	--	--	1.1E+04	3.3E+05	--	--	1.1E+04	3.3E+05
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	7.4E+04	4.6E+06	--	--	3.4E-01	2.1E+01	--	--	7.4E+03	4.6E+05	--	--	7.4E+03	4.6E+05
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	9.3E+00	1.5E+02	1.1E+01	1.2E+01	6.0E-02	1.4E-02	5.2E-05	5.4E-05	4.0E+02	1.2E+02	1.1E+00	1.2E+00	9.3E+00	1.2E+02	1.1E+00	1.2E+00
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.8E+08	4.7E+08	--	--	1.7E+03	4.4E+03	--	--	1.8E+07	4.7E+07	--	--	1.8E+07	4.7E+07
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	4.1E+06	9.1E+06	--	--	3.8E+01	8.5E+01	--	--	4.1E+05	9.1E+05	--	--	4.1E+05	9.1E+05
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.9E+09	1.2E+10	--	--	2.7E+04	1.1E+05	--	--	2.9E+08	1.2E+09	--	--	2.9E+08	1.2E+09
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.1E+07	4.8E+07	--	--	2.0E+02	4.5E+02	--	--	2.1E+06	4.8E+06	--	--	2.1E+06	4.8E+06
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	7.4E+05	5.7E+07	--	--	6.9E+00	5.3E+02	--	--	7.4E+04	5.7E+06	--	--	7.4E+04	5.7E+06
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.4E+05	3.0E+06	--	--	1.3E+00	2.8E+01	--	--	1.4E+04	3.0E+05	--	--	1.4E+04	3.0E+05
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	3.4E+00	3.4E+01	--	--	2.4E+04	7.4E+05	--	--	1.1E-01	3.4E+00	--	--	2.4E+03	7.4E+04	--	--	2.4E+03	7.4E+04
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.3E-04	5.4E-04	--	--	5.0E-09	5.1E-09	--	--	5.3E-05	5.4E-05	--	--	5.3E-05	5.4E-05
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	3.6E-01	2.0E+00	--	--	7.8E+03	4.3E+04	--	--	3.6E-02	2.0E-01	--	--	7.8E+02	4.3E+03	--	--	7.8E+02	4.3E+03
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	8.5E+00	1.5E+02	6.6E+05	9.5E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.6E+02	1.2E+02	6.6E+04	9.5E+04	8.5E+00	1.2E+02	6.6E+04	9.5E+04
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	8.5E+00	1.5E+02	6.6E+05	9.5E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.6E+02	1.2E+02	6.6E+04	9.5E+04	8.5E+00	1.2E+02	6.6E+04	9.5E+04
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	8.5E+00	1.5E+02	--	--	5.5E-02	1.4E-02	--	--	3.6E+02	1.2E+02	--	--	8.5E+00	1.2E+02	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.6E+05	9.5E+05	--	--	6.2E+00	8.9E+00	--	--	6.6E+04	9.5E+04	--	--	6.6E+04	9.5E+04
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	3.3E+00	9.9E+01	6.3E+02	6.4E+02	2.2E-02	9.0E-03	5.9E-03	6.0E-03	1.4E+02	7.4E+01	6.3E+01	6.4E+01	3.3E+00	7.4E+01	6.3E+01	6.4E+01
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.1E+03	3.2E+03	--	--	2.9E-02	3.0E-02	--	--	3.1E+02	3.2E+02	--	--	3.1E+02	3.2E+02

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	5.7E+06	2.2E+07	--	--	5.3E+01	2.1E+02	--	--	5.7E+05	2.2E+06	--	--	5.7E+05	2.2E+06
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.4E+06	1.5E+06	--	--	1.3E+01	1.4E+01	--	--	1.4E+05	1.5E+05	--	--	1.4E+05	1.5E+05
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.2E+07	5.7E+07	--	--	1.1E+02	5.3E+02	--	--	1.2E+06	5.7E+06	--	--	1.2E+06	5.7E+06
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.3E+06	--	--	--	5.0E+01	--	--	--	5.3E+05	--	--	--	5.3E+05	--
Guthion	0	--	1.0E-02	--	--	--	2.7E+01	--	--	--	2.5E-03	--	--	--	2.1E+01	--	--	--	2.1E+01	--	--
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	2.0E+01	1.0E+01	1.7E+01	1.7E+01	1.3E-01	9.5E-04	7.9E-05	7.9E-05	8.6E+02	7.8E+00	1.7E+00	1.7E+00	2.0E+01	7.8E+00	1.7E+00	1.7E+00
Heptachlor Epoxide <sup>c</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	2.0E+01	1.0E+01	8.5E+00	8.5E+00	1.3E-01	9.5E-04	3.9E-05	3.9E-05	8.6E+02	7.8E+00	8.5E-01	8.5E-01	2.0E+01	7.8E+00	8.5E-01	8.5E-01
Hexachlorobenzene <sup>f</sup>	0	--	--	2.8E-03	2.9E-03	--	--	6.1E+01	6.3E+01	--	--	2.8E-04	2.9E-04	--	--	6.1E+00	6.3E+00	--	--	6.1E+00	6.3E+00
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	9.6E+04	3.9E+06	--	--	4.4E-01	1.8E+01	--	--	9.6E+03	3.9E+05	--	--	9.6E+03	3.9E+05
Hexachlorocyclohexane	0	--	--	2.6E-02	4.9E-02	--	--	5.6E+02	1.1E+03	--	--	2.6E-03	4.9E-03	--	--	5.6E+01	1.1E+02	--	--	5.6E+01	1.1E+02
Alpha-BHC <sup>c</sup>	0	--	--	9.1E-02	1.7E-01	--	--	2.0E+03	3.7E+03	--	--	9.1E-03	1.7E-02	--	--	2.0E+02	3.7E+02	--	--	2.0E+02	3.7E+02
Hexachlorocyclohexane Beta BHC <sup>c</sup>	0	--	--	9.8E-01	1.8E+00	3.7E+01	--	2.1E+04	3.9E+04	2.4E-01	--	9.8E-02	1.8E-01	1.6E+03	--	2.1E+03	3.9E+03	3.7E+01	--	2.1E+03	3.9E+03
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.3E+05	1.2E+07	--	--	4.0E+00	1.1E+02	--	--	4.3E+04	1.2E+06	--	--	4.3E+04	1.2E+06
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	3.0E+05	7.2E+05	--	--	1.4E+00	3.3E+00	--	--	3.0E+04	7.2E+04	--	--	3.0E+04	7.2E+04
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	5.5E+03	--	--	--	5.0E-01	--	--	--	4.1E+03	--	--	--	4.1E+03	--	--
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	8.3E+02	3.9E+03	--	--	3.8E-03	1.8E-02	--	--	8.3E+01	3.9E+02	--	--	8.3E+01	3.9E+02
Iron	0	--	--	3.0E+02	--	--	--	3.2E+06	--	--	--	3.0E+01	--	--	--	3.2E+05	--	--	--	3.2E+05	--
Isophorone <sup>c</sup>	0	--	--	3.5E+02	9.6E+03	--	--	7.6E+06	2.1E+08	--	--	3.5E+01	9.6E+02	--	--	7.6E+05	2.1E+07	--	--	7.6E+05	2.1E+07
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Lead	0	8.7E+01	9.8E+00	1.5E+01	--	3.4E+03	2.7E+04	1.6E+05	--	2.2E+01	2.5E+00	1.5E+00	--	1.4E+05	2.0E+04	1.6E+04	--	3.4E+03	2.0E+04	1.6E+04	--
Malathion	0	--	1.0E-01	--	--	--	2.7E+02	--	--	--	2.5E-02	--	--	--	2.1E+02	--	--	--	2.1E+02	--	--
Manganese	14.32	--	--	5.0E+01	--	--	--	3.8E+05	--	--	--	1.8E+01	--	--	--	3.8E+04	--	--	--	3.8E+04	--
Mercury	0	1.4E+00	7.7E-01	--	--	5.4E+01	2.1E+03	--	--	3.5E-01	1.9E-01	--	--	2.3E+03	1.6E+03	--	--	5.4E+01	1.6E+03	--	--
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	5.0E+05	1.6E+07	--	--	4.7E+00	1.5E+02	--	--	5.0E+04	1.6E+06	--	--	5.0E+04	1.6E+06
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	1.0E+06	1.3E+08	--	--	4.6E+00	5.9E+02	--	--	1.0E+05	1.3E+07	--	--	1.0E+05	1.3E+07
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	8.2E+01	1.1E+06	--	--	7.5E-03	1.0E+01	--	--	6.2E+01	1.1E+05	--	--	6.2E+01	1.1E+05	
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	5.7E+03	4.4E+04	6.5E+06	4.9E+07	3.7E+01	4.4E+00	6.1E+01	4.6E+02	2.4E+05	3.3E+04	6.5E+05	4.9E+06	5.7E+03	3.3E+04	6.5E+05	4.9E+06
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	9.7E+07	--	--	--	1.8E+03	--	--	--	9.7E+06	--	--	--	9.7E+06	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.8E+05	7.4E+06	--	--	1.7E+00	6.9E+01	--	--	1.8E+04	7.4E+05	--	--	1.8E+04	7.4E+05
N-Nitrosodimethylamine <sup>g</sup>	0	--	--	6.9E-03	3.0E+01	--	--	1.5E+02	6.5E+05	--	--	6.9E-04	3.0E+00	--	--	1.5E+01	6.5E+04	--	--	1.5E+01	6.5E+04
N-Nitrosodiphenylamine <sup>g</sup>	0	--	--	3.3E+01	6.0E+01	--	--	7.2E+05	1.3E+06	--	--	3.3E+00	6.0E+00	--	--	7.2E+04	1.3E+05	--	--	7.2E+04	1.3E+05
N-Nitrosodi-n-propylamine <sup>g</sup>	0	--	--	5.0E-02	5.1E+00	--	--	1.1E+03	1.1E+05	--	--	5.0E-03	5.1E-01	--	--	1.1E+02	1.1E+04	--	--	1.1E+02	1.1E+04
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.1E+03	1.8E+04	--	--	7.0E+00	1.7E+00	--	--	4.6E+04	1.4E+04	--	--	1.1E+03	1.4E+04	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	2.5E+00	3.6E+01	--	--	1.6E-02	3.3E-03	--	--	1.1E+02	2.7E+01	--	--	2.5E+00	2.7E+01	--	--
PCB Total <sup>c</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	3.8E+01	1.4E+01	1.4E+01	--	3.5E-03	6.4E-05	6.4E-05	--	2.9E+01	1.4E+00	1.4E+00	--	2.9E+01	1.4E+00	1.4E+00
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	4.7E+02	2.5E+04	5.9E+04	6.5E+05	3.0E+00	2.3E+00	2.7E-01	3.0E+00	2.0E+04	1.9E+04	5.9E+03	6.5E+04	4.7E+02	1.9E+04	5.9E+03	6.5E+04
Phenol	0	--	--	1.0E+04	8.6E-05	--	--	1.1E+08	9.2E+09	--	--	1.0E+03	8.6E+04	--	--	1.1E+07	9.2E+08	--	--	1.1E+07	9.2E+08
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	8.9E+06	4.3E+07	--	--	8.3E+01	4.0E+02	--	--	8.9E+05	4.3E+06	--	--	8.9E+05	4.3E+06
Radiionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.6E+05	--	--	--	1.5E+00	--	--	--	1.6E+04	--	--	--	1.6E+04	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	4.3E+04	4.3E+04	--	--	4.0E-01	4.0E-01	--	--	4.3E+03	4.3E+03	--	--	4.3E+03	4.3E+03
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.3E+04	--	--	--	5.0E-01	--	--	--	5.3E+03	--	--	--	5.3E+03	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.2E+05	--	--	--	3.0E+00	--	--	--	3.2E+04	--	--	--	3.2E+04	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	7.7E+02	1.4E+04	1.8E+06	4.5E+07	5.0E+00	1.3E+00	1.7E+01	4.2E+02	3.3E+04	1.0E+04	1.8E+05	4.5E+06	7.7E+02	1.0E+04	1.8E+05	4.5E+06	
Silver	0	2.3E+00	--	--	--	8.7E+01	--	--	--	5.6E-01	--	--	--	3.7E+03	--	--	--	8.7E+01	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	2.6E+09	--	--	--	3.2E+04	--	--	--	2.6E+08	--	--	--	2.6E+08	--	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	3.7E+04	8.7E+05	--	--	1.7E-01	4.0E+00	--	--	3.7E+03	8.7E+04	--	--	3.7E+03	8.7E+04	
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	1.5E+05	7.2E+05	--	--	6.9E-01	3.3E+00	--	--	1.5E+04	7.2E+04	--	--	1.5E+04	7.2E+04	
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.6E+03	5.0E+03	--	--	2.4E-02	4.7E-02	--	--	2.6E+02	5.0E+02	--	--	2.6E+02	5.0E+02	
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.4E+06	6.4E+07	--	--	5.1E+01	6.0E+02	--	--	5.4E+05	6.4E+06	--	--	5.4E+05	6.4E+06	
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.3E+09	--	--	--	5.0E+04	--	--	--	5.3E+08	--	--	--	5.3E+08	--	
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	2.8E+01	5.5E-01	6.1E+01	6.1E+01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.2E+03	4.1E-01	6.1E+00	6.1E+00	2.8E+01	4.1E-01	6.1E+00	6.1E+00	
Tributyltin	0	4.6E-01	7.2E-02	--	--	1.8E+01	2.0E+02	--	--	1.2E-01	1.8E-02	--	--	7.6E+02	1.5E+02	--	--	1.8E+01	1.5E+02	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.7E+05	7.5E+05	--	--	3.5E+00	7.0E+00	--	--	3.7E+04	7.5E+04	--	--	3.7E+04	7.5E+04	
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	1.3E+05	3.5E+06	--	--	5.9E-01	1.6E+01	--	--	1.3E+04	3.5E+05	--	--	1.3E+04	3.5E+05	
Trichlorethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	5.4E+05	6.5E+06	--	--	2.5E+00	3.0E+01	--	--	5.4E+04	6.5E+05	--	--	5.4E+04	6.5E+05	
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	3.0E+05	5.2E+05	--	--	1.4E+00	2.4E+00	--	--	3.0E+04	5.2E+04	--	--	3.0E+04	5.2E+04	
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.3E+05	--	--	--	5.0E+00	--	--	--	5.3E+04	--	--	--	5.3E+04	--	
Vinyl Chloride <sup>c</sup>	0	--	--	--	2.5E-01	2.4E+01	--	--	5.4E+03	5.2E+05	--	--	2.5E-02	2.4E+00	--	--	5.4E+02	5.2E+04	--	--	5.4E+02	5.2E+04
Zinc	3.68	9.5E+01	9.6E+01	7.4E+03	2.6E+04	3.5E+03	2.5E+05	7.9E+07	2.8E+08	2.6E+01	2.7E+01	7.4E+02	2.6E+03	1.5E+05	1.9E+05	7.9E+06	2.8E+07	3.5E+03	1.9E+05	7.9E+06	2.8E+07	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.0E+03
Arsenic	5.3E+03
Barium	2.1E+06
Cadmium	4.6E+01
Chromium III	7.2E+03
Chromium VI	2.5E+02
Copper	1.5E+02
Iron	3.2E+05
Lead	1.3E+03
Manganese	3.8E+04
Mercury	2.2E+01
Nickel	2.3E+03
Selenium	3.1E+02
Silver	3.5E+01
Zinc	1.4E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

## Mixing Zone Predictions for

VA0000248 - 029

Effluent Flow = 1.57 MGD

Stream 7Q10 = 559 MGD

Stream 30Q10 = 646 MGD

Stream 1Q10 = 449 MGD

Stream slope = 0.001 ft/ft

Stream width = 500 ft

Bottom scale = 3

Channel scale = 1

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### Mixing Zone Predictions @ 7Q10

Depth = 2.3237 ft

Length = 117498.07 ft

Velocity = .7469 ft/sec

Residence Time = 1.8209 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

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### Mixing Zone Predictions @ 30Q10

Depth = 2.5347 ft

Length = 109229.34 ft

Velocity = .791 ft/sec

Residence Time = 1.5983 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

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### Mixing Zone Predictions @ 1Q10

Depth = 2.0374 ft

Length = 131207.28 ft

Velocity = .6847 ft/sec

Residence Time = 53.2311 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.88% of the 1Q10 is used.

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**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 029

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	1.88 %			Mean Hardness (as CaCO <sub>3</sub> ) =	106 mg/L		
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	100 %			90% Temp (Annual) =	25 deg C		
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =	100 %			90% Temp (Wet season) =	20 deg C		
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	529 MGD	Wet Season - 1Q10 Mix =	100 %			90% Maximum pH =	7.95 SU		
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %			10% Maximum pH =	7.5 SU		
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD					Discharge Flow =	1.57 MGD		
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	3.1E+05	4.6E+05	--	--	6.7E+01	9.9E+01	--	--	3.1E+04	4.6E+04	--	--	3.1E+04	4.6E+04
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	2.8E+03	4.3E+03	--	--	6.1E-01	9.3E-01	--	--	2.8E+02	4.3E+02	--	--	2.8E+02	4.3E+02
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	4.9E+02	2.4E+03	--	--	5.1E-02	2.5E-01	--	--	4.9E+01	2.4E+02	--	--	4.9E+01	2.4E+02
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	1.9E+01	--	4.7E-01	4.8E-01	7.5E-01	--	4.9E-05	5.0E-05	2.2E+02	--	4.7E-02	4.8E-02	1.9E+01	--	4.7E-02	4.8E-02
Ammonia-N (mg/l) (Yearly)	0	4.09E+00	9.87E-01	--	--	2.6E+01	4.1E+02	--	--	9.22E-01	2.47E-01	--	--	2.6E+02	1.0E+02	--	--	2.6E+01	1.0E+02	--	--
Ammonia-N (mg/l) (High Flow)	0	3.69E+00	1.74E+00	--	--	1.2E+03	1.2E+03	--	--	9.22E-01	4.35E-01	--	--	3.1E+02	3.0E+02	--	--	3.1E+02	3.0E+02	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	3.8E+06	1.9E+07	--	--	8.3E+02	4.0E+03	--	--	3.8E+05	1.9E+06	--	--	3.8E+05	1.9E+06
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	2.6E+03	3.0E+05	--	--	5.6E-01	6.4E+01	--	--	2.6E+02	3.0E+04	--	--	2.6E+02	3.0E+04
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	2.2E+03	5.3E+04	4.5E+03	--	8.5E+01	3.8E+01	1.3E+00	--	2.4E+04	1.3E+04	4.5E+02	--	2.2E+03	1.3E+04	4.5E+02	--
Barium	0	--	--	2.0E+03	--	--	--	9.3E+05	--	--	--	2.0E+02	--	--	--	9.3E+04	--	--	--	9.3E+04	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	2.1E+04	4.9E+05	--	--	2.2E+00	5.1E+01	--	--	2.1E+03	4.9E+04	--	--	2.1E+03	4.9E+04
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	8.3E-01	1.9E+00	--	--	8.6E-05	2.0E-04	--	--	8.3E-02	1.9E-01	--	--	8.3E-02	1.9E-01
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	2.9E+02	5.1E+03	--	--	3.0E-02	5.3E-01	--	--	2.9E+01	5.1E+02	--	--	2.9E+01	5.1E+02
Bis2-Chloroisopropyl Ether <sup>c</sup>	0	--	--	1.4E+03	6.5E+04	--	--	6.5E+05	3.0E+07	--	--	1.4E+02	6.5E+03	--	--	6.5E+04	3.0E+06	--	--	6.5E+04	3.0E+06
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	1.2E+04	2.1E+04	--	--	1.2E+00	2.2E+00	--	--	1.2E+03	2.1E+03	--	--	1.2E+03	2.1E+03
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	4.2E+04	1.4E+06	--	--	4.3E+00	1.4E+02	--	--	4.2E+03	1.4E+05	--	--	4.2E+03	1.4E+05
Bulybenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	7.0E+05	8.8E+05	--	--	1.5E+02	1.9E+02	--	--	7.0E+04	8.8E+04	--	--	7.0E+04	8.8E+04
Cadmium	0	3.2E+00	9.3E-01	5.0E+00	--	2.0E+01	3.3E+02	2.3E+03	--	7.4E-01	2.3E-01	5.0E-01	--	2.1E+02	8.3E+01	2.3E+02	--	2.0E+01	8.3E+01	2.3E+02	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	2.2E+03	1.6E+04	--	--	2.3E-01	1.6E+00	--	--	2.2E+02	1.6E+03	--	--	2.2E+02	1.6E+03
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.5E+01	1.5E+00	7.8E+00	7.9E+00	6.0E-01	1.1E-03	8.0E-04	8.1E-04	1.7E+02	3.8E-01	7.8E-01	7.9E-01	1.5E+01	3.8E-01	7.8E-01	7.9E-01
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	5.4E+06	7.9E+07	1.1E+08	--	2.2E+05	6.3E+04	3.2E+04	--	6.1E+07	2.0E+07	1.1E+07	--	5.4E+06	2.0E+07	1.1E+07	--
TRC	0	1.9E+01	1.1E+01	--	--	1.2E+02	3.9E+03	--	--	4.8E+00	2.8E+00	--	--	1.4E+03	9.8E+02	--	--	1.2E+02	9.8E+02	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	6.0E+04	7.4E+05	--	--	1.3E+01	1.6E+02	--	--	6.0E+03	7.4E+04	--	--	6.0E+03	7.4E+04

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	3.9E+03	1.3E+05	--	--	4.0E-01	1.3E+01	--	--	3.9E+02	1.3E+04	--	--	3.9E+02	1.3E+04
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.6E+05	5.1E+05	--	--	3.4E+01	1.1E+03	--	--	1.6E+04	5.1E+05	--	--	1.6E+04	5.1E+05
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	4.6E+05	7.4E+05	--	--	1.0E+02	1.6E+02	--	--	4.6E+04	7.4E+04	--	--	4.6E+04	7.4E+04
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	3.8E+04	7.0E+04	--	--	8.1E+00	1.5E+01	--	--	3.8E+03	7.0E+03	--	--	3.8E+03	7.0E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	5.3E-01	1.5E+01	--	--	2.1E-02	1.0E-02	--	--	6.0E+00	3.7E+00	--	--	5.3E-01	3.7E+00	--	--
Chromium III	0	4.9E+02	6.1E+01	--	--	3.1E+03	2.2E+04	--	--	1.2E+02	1.5E+01	--	--	3.3E+04	5.4E+03	--	--	3.1E+03	5.4E+03	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.0E+02	3.9E+03	--	--	4.0E+00	2.8E+00	--	--	1.1E+03	9.8E+02	--	--	1.0E+02	9.8E+02	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	4.6E+04	--	--	--	1.0E+01	--	--	--	4.6E+03	--	--	--	4.6E+03	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.8E-04	1.8E-03	--	--	3.7E-01	1.7E+00	--	--	3.7E-01	1.7E+00
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	6.8E+01	2.4E+03	6.0E+05	--	3.1E+00	2.3E+00	1.3E+02	--	7.2E+02	5.9E+02	6.0E+04	--	6.8E+01	5.9E+02	6.0E+04	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.4E+02	1.9E+03	6.5E+04	7.4E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	1.6E+03	4.6E+02	6.5E+03	1.4E+02	4.6E+02	6.5E+03	7.4E+05	
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	3.0E+00	3.0E+00	--	--	3.1E-04	3.1E-04	--	--	3.0E-01	3.0E-01	--	--	3.0E-01	3.0E-01
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	2.1E+00	2.1E+00	--	--	2.2E-04	2.2E-04	--	--	2.1E-01	2.1E-01	--	--	2.1E-01	2.1E-01
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	7.0E+00	3.6E-01	2.1E+00	2.1E+00	2.8E-01	2.5E-04	2.2E-04	2.2E-04	7.9E+01	8.9E-02	2.1E-01	2.1E-01	7.0E+00	8.9E-02	2.1E-01	2.1E-01
Demeton	0	--	--	1.0E-01	--	--	--	3.6E+01	--	--	--	2.5E-02	--	--	--	8.9E+00	--	--	--	8.9E+00	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.1E+00	6.1E+01	--	--	4.3E-02	4.3E-02	--	--	1.2E+01	1.5E+01	--	--	1.1E+00	1.5E+01	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.9E+05	6.0E+05	--	--	4.2E+01	1.3E+02	--	--	1.9E+04	6.0E+04	--	--	1.9E+04	6.0E+04
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.5E+05	4.4E+05	--	--	3.2E+01	9.6E+01	--	--	1.5E+04	4.4E+04	--	--	1.5E+04	4.4E+04
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	2.9E+04	8.8E+04	--	--	6.3E+00	1.9E+01	--	--	2.9E+03	8.8E+03	--	--	2.9E+03	8.8E+03
3,3-Dichlorobenzidine <sup>b</sup>	0	--	--	2.1E-01	2.8E-01	--	--	2.0E+02	2.7E+02	--	--	2.1E-02	2.8E-02	--	--	2.0E+01	2.7E+01	--	--	2.0E+01	2.7E+01
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	5.3E+03	1.6E+05	--	--	5.5E-01	1.7E+01	--	--	5.3E+02	1.6E+04	--	--	5.3E+02	1.6E+04
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	3.7E+03	3.6E+05	--	--	3.8E-01	3.7E+01	--	--	3.7E+02	3.6E+04	--	--	3.7E+02	3.6E+04
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.5E+05	3.3E+06	--	--	3.3E+01	7.1E+02	--	--	1.5E+04	3.3E+05	--	--	1.5E+04	3.3E+05
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	6.5E+04	4.6E+06	--	--	1.4E+01	1.0E+03	--	--	6.5E+03	4.6E+05	--	--	6.5E+03	4.6E+05
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	3.6E+04	1.3E+05	--	--	7.7E+00	2.9E+01	--	--	3.6E+03	1.3E+04	--	--	3.6E+03	1.3E+04
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	4.6E+04	--	--	--	1.0E+01	--	--	--	4.6E+03	--	--	--	4.6E+03	--
1,2-Dichloropropane <sup>b</sup>	0	--	--	5.0E+00	1.5E+02	--	--	4.8E+03	1.5E+05	--	--	5.0E-01	1.5E+01	--	--	4.8E+02	1.5E+04	--	--	4.8E+02	1.5E+04
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	3.3E+03	2.0E+05	--	--	3.4E-01	2.1E+01	--	--	3.3E+02	2.0E+04	--	--	3.3E+02	2.0E+04
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.5E+00	2.0E+01	5.0E-01	5.2E-01	6.0E-02	1.4E-02	5.2E-05	5.4E-05	1.7E+01	5.0E+00	5.0E-02	5.2E-02	1.5E+00	5.0E+00	5.0E-02	5.2E-02
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	7.9E+06	2.0E+07	--	--	1.7E+03	4.4E+03	--	--	7.9E+05	2.0E+06	--	--	7.9E+05	2.0E+06
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	1.8E+05	3.9E+05	--	--	3.8E+01	8.5E+01	--	--	1.8E+04	3.9E+04	--	--	1.8E+04	3.9E+04
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.3E+08	5.1E+08	--	--	2.7E+04	1.1E+05	--	--	1.3E+07	5.1E+07	--	--	1.3E+07	5.1E+07
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	9.3E+05	2.1E+06	--	--	2.0E+02	4.5E+02	--	--	9.3E+04	2.1E+05	--	--	9.3E+04	2.1E+05
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	3.2E+04	2.5E+06	--	--	6.9E+00	5.3E+02	--	--	3.2E+03	2.5E+05	--	--	3.2E+03	2.5E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	6.0E+03	1.3E+05	--	--	1.3E+00	2.8E+01	--	--	6.0E+02	1.3E+04	--	--	6.0E+02	1.3E+04
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	1.1E+03	3.3E+04	--	--	1.1E-01	3.4E+00	--	--	1.1E+02	3.3E+03	--	--	1.1E+02	3.3E+03
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	2.3E-05	2.4E-05	--	--	5.0E-09	5.1E-09	--	--	2.3E-06	2.4E-06	--	--	2.3E-06	2.4E-06
1,2-Diphenylhydrazine <sup>b</sup>	0	--	--	3.6E-01	2.0E+00	--	--	3.5E+02	1.9E+03	--	--	3.6E-02	2.0E-01	--	--	3.5E+01	1.9E+02	--	--	3.5E+01	1.9E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.4E+00	2.0E+01	2.9E+04	4.1E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.6E+01	5.0E+00	2.9E+03	4.1E+03	1.4E+00	5.0E+00	2.9E+03	4.1E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.4E+00	2.0E+01	2.9E+04	4.1E+04	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.6E+01	5.0E+00	2.9E+03	4.1E+03	1.4E+00	5.0E+00	2.9E+03	4.1E+03
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.4E+00	2.0E+01	--	--	5.5E-02	1.4E-02	--	--	1.6E+01	5.0E+00	--	--	1.4E+00	5.0E+00	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	2.9E+04	4.1E+04	--	--	6.2E+00	8.9E+00	--	--	2.9E+03	4.1E+03	--	--	2.9E+03	4.1E+03
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	5.5E-01	1.3E+01	2.7E+01	2.8E+01	2.2E-02	9.0E-03	5.9E-03	6.0E-03	5.2E+00	3.2E+00	2.7E+00	2.8E+00	5.5E-01	3.2E+00	2.7E+00	2.8E+00
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.3E+02	1.4E+02	--	--	2.9E-02	3.0E-02	--	--	1.3E+01	1.4E+01	--	--	1.3E+01	1.4E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	2.5E+05	9.7E+05	--	--	5.3E+01	2.1E+02	--	--	2.5E+04	9.7E+04	--	--	2.5E+04	9.7E+04	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	6.0E+04	6.5E+04	--	--	1.3E+01	1.4E+01	--	--	6.0E+03	6.5E+03	--	--	6.0E+03	6.5E+03	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	5.1E+05	2.5E+06	--	--	1.1E+02	5.3E+02	--	--	5.1E+04	2.5E+05	--	--	5.1E+04	2.5E+05	
Foaming Agents	0	--	--	5.0E+02	--	--	--	2.3E+05	--	--	--	5.0E+01	--	--	--	2.3E+04	--	--	--	2.3E+04	--	
Guthion	0	--	1.0E-02	--	--	--	3.6E+00	--	--	--	2.5E-03	--	--	--	8.9E-01	--	--	--	8.9E-01	--	--	
Heptachlor C	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	3.3E+00	1.4E+00	7.7E-01	7.7E-01	1.3E-01	9.5E-04	7.9E-05	7.9E-05	3.7E+01	3.4E-01	7.7E-02	7.7E-02	3.3E+00	3.4E-01	7.7E-02	7.7E-02	
Heptachlor Epoxide F	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	3.3E+00	1.4E+00	3.8E-01	3.8E-01	1.3E-01	9.5E-04	3.9E-05	3.9E-05	3.7E+01	3.4E-01	3.8E-02	3.8E-02	3.3E+00	3.4E-01	3.8E-02	3.8E-02	
Hexachlorobenzene F	0	--	--	2.8E-03	2.9E-03	--	--	2.7E+00	2.8E+00	--	--	2.8E-04	2.9E-04	--	--	2.7E-01	2.8E-01	--	--	2.7E-01	2.8E-01	
Hexachlorobutadiene F	0	--	--	4.4E+00	1.8E+02	--	--	4.3E+03	1.7E+05	--	--	4.4E-01	1.8E+01	--	--	4.3E+02	1.7E+04	--	--	4.3E+02	1.7E+04	
Hexachlorocyclohexane																						
Alpha-BHC C	0	--	--	2.6E-02	4.9E-02	--	--	2.5E+01	4.7E+01	--	--	2.6E-03	4.9E-03	--	--	2.5E+00	4.7E+00	--	--	2.5E+00	4.7E+00	
Hexachlorocyclohexane Beta BHC C	0	--	--	9.1E-02	1.7E-01	--	--	8.8E+01	1.6E+02	--	--	9.1E-03	1.7E-02	--	--	8.8E+00	1.6E+01	--	--	8.8E+00	1.6E+01	
Hexachlorocyclohexane Gamma-BHC (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	6.1E+00	--	9.5E+02	1.7E+03	2.4E-01	--	9.8E-02	1.8E-01	6.8E+01	--	9.5E+01	1.7E+02	6.1E+00	--	9.5E+01	1.7E+02	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.9E+04	5.1E+05	--	--	4.0E+00	1.1E+02	--	--	1.9E+03	5.1E+04	--	--	1.9E+03	5.1E+04	
Hexachloroethane F	0	--	--	1.4E+01	3.3E+01	--	--	1.4E+04	3.2E+04	--	--	1.4E+00	3.3E+00	--	--	1.4E+03	3.2E+03	--	--	1.4E+03	3.2E+03	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	7.1E+02	--	--	--	5.0E-01	--	--	--	1.8E+02	--	--	--	1.8E+02	--	--	
Indeno (1,2,3-cd) pyrene C	0	--	--	3.8E-02	1.8E-01	--	--	3.7E+01	1.7E+02	--	--	3.8E-03	1.8E-02	--	--	3.7E+00	1.7E+01	--	--	3.7E+00	1.7E+01	
Iron	0	--	--	3.0E+02	--	--	--	1.4E+05	--	--	--	3.0E+01	--	--	--	1.4E+04	--	--	--	1.4E+04	--	
Isophorone F	0	--	--	3.5E+02	9.6E+03	--	--	3.4E+05	9.3E+06	--	--	3.5E+01	9.6E+02	--	--	3.4E+04	9.3E+05	--	--	3.4E+04	9.3E+05	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	9.3E+01	9.9E+00	1.5E+01	--	5.9E+02	3.5E+03	7.0E+03	--	2.2E+01	2.5E+00	1.5E+00	--	6.2E+03	8.8E+02	7.0E+02	--	5.9E+02	8.8E+02	7.0E+02	--	
Malathion	0	--	1.0E-01	--	--	--	3.6E+01	--	--	--	2.6E-02	--	--	--	8.9E+00	--	--	--	8.9E+00	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	1.7E+04	--	--	--	1.8E+01	--	--	--	1.7E+03	--	--	--	1.7E+03	--	
Mercury	0	1.4E+00	7.7E-01	--	--	8.9E+00	2.7E+02	--	--	3.5E-01	1.9E-01	--	--	1.0E+02	6.9E+01	--	--	8.9E+00	6.9E+01	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	2.2E+04	7.0E+05	--	--	4.7E+00	1.5E+02	--	--	2.2E+03	7.0E+04	--	--	2.2E+03	7.0E+04	
Methylene Chloride C	0	--	--	4.6E+01	5.9E+03	--	--	4.5E+04	5.7E+06	--	--	4.6E+00	5.9E+02	--	--	4.5E+03	5.7E+05	--	--	4.5E+03	5.7E+05	
Methoxychlor	0	--	--	3.0E-02	1.0E+02	--	--	1.1E+01	4.6E+04	--	--	7.5E-03	1.0E+01	--	--	2.7E+00	4.6E+03	--	--	2.7E+00	4.6E+03	
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	9.8E+02	5.7E+03	2.8E+05	2.1E+06	3.7E+01	4.4E+00	6.1E+01	4.6E+02	1.1E+04	1.4E+03	2.8E+04	2.1E+05	9.8E+02	1.4E+03	2.8E+04	2.1E+05	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	4.2E+06	--	--	--	1.8E+03	--	--	--	4.2E+05	--	--	--	4.2E+05	--	
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	7.9E+03	3.2E+05	--	--	1.7E+00	6.9E+01	--	--	7.9E+02	3.2E+04	--	--	7.9E+02	3.2E+04	
N-Nitrosodimethylamine F	0	--	--	6.9E-03	3.0E+01	--	--	6.7E+00	2.9E+04	--	--	6.9E-04	3.0E+00	--	--	6.7E-01	2.9E+03	--	--	6.7E-01	2.9E+03	
N-Nitrosodiphenylamine F	0	--	--	3.3E+01	6.0E+01	--	--	3.2E+04	5.8E+04	--	--	3.3E+00	6.0E+00	--	--	3.2E+03	5.8E+03	--	--	3.2E+03	5.8E+03	
N-Nitrosodi-n-propylamine F	0	--	--	5.0E-02	5.1E+00	--	--	4.8E+01	4.9E+03	--	--	5.0E-03	5.1E-01	--	--	4.8E+00	4.9E+02	--	--	4.8E+00	4.9E+02	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.8E+02	2.4E+03	--	--	7.0E+00	1.7E+00	--	--	2.0E+03	5.9E+02	--	--	1.8E+02	5.9E+02	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	4.1E-01	4.6E+00	--	--	1.6E-02	3.3E-03	--	--	4.7E+00	1.2E+00	--	--	4.1E-01	1.2E+00	--	--	
PCB Total F	0	--	1.4E-02	6.4E-04	6.4E-04	--	5.0E+00	6.2E-01	6.2E-01	--	3.5E-03	6.4E-05	6.4E-05	--	1.2E+00	6.2E-02	6.2E-02	--	1.2E+00	6.2E-02	6.2E-02	
Penlachlorophenol C	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	7.9E+01	3.3E+03	2.6E+03	2.9E+04	3.0E+00	2.3E+00	2.7E-01	3.0E+00	8.6E+02	8.2E+02	2.6E+02	2.9E+03	7.9E+01	8.2E+02	2.6E+02	2.9E+03	
Phend	0	--	--	1.0E+04	8.6E+05	--	--	4.6E+06	4.0E+08	--	--	1.0E+03	8.6E+04	--	--	4.6E+05	4.0E+07	--	--	4.6E+05	4.0E+07	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	3.8E+05	1.9E+06	--	--	8.3E+01	4.0E+02	--	--	3.8E+04	1.9E+05	--	--	3.8E+04	1.9E+05	
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	7.0E+03	--	--	--	1.5E+00	--	--	--	7.0E+02	--	--	--	7.0E+02	--	
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.9E+03	1.9E+03	--	--	4.0E-01	4.0E-01	--	--	1.9E+02	1.9E+02	--	--	1.9E+02	1.9E+02	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	2.3E+03	--	--	--	5.0E-01	--	--	--	2.3E+02	--	--	--	2.3E+02	--	
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.4E+04	--	--	--	3.0E+00	--	--	--	1.4E+03	--	--	--	1.4E+03	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.3E+02	1.8E+03	7.9E+04	1.9E+06	5.0E+00	1.3E+00	1.7E+01	4.2E+02	1.4E+03	4.5E+02	7.9E+03	1.9E+05	1.3E+02	4.5E+02	7.9E+03	1.9E+05	
Silver	0	2.5E+00	--	--	--	1.6E+01	--	--	--	5.6E-01	--	--	--	1.6E+02	--	--	--	1.6E+01	--	--	--	
Sulfate	7870	--	--	2.5E+05	--	--	--	1.1E+08	--	--	--	3.2E+04	--	--	--	1.1E+07	--	--	--	1.1E+07	--	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	1.6E+03	3.9E+04	--	--	1.7E-01	4.0E+00	--	--	1.6E+02	3.9E+03	--	--	1.6E+02	3.9E+03	
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	6.7E+03	3.2E+04	--	--	6.9E-01	3.3E+00	--	--	6.7E+02	3.2E+03	--	--	6.7E+02	3.2E+03	
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.1E+02	2.2E+02	--	--	2.4E-02	4.7E-02	--	--	1.1E+01	2.2E+01	--	--	1.1E+01	2.2E+01	
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	2.4E+05	2.8E+06	--	--	5.1E+01	6.0E+02	--	--	2.4E+04	2.8E+05	--	--	2.4E+04	2.8E+05	
Total dissolved solids	0	--	--	5.0E+05	--	--	--	2.3E+08	--	--	--	5.0E+04	--	--	--	2.3E+07	--	--	--	2.3E+07	--	
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	4.7E+00	7.1E-02	2.7E+00	2.7E+00	1.8E-01	5.0E-05	2.8E-04	2.8E-04	5.2E+01	1.8E-02	2.7E-01	2.7E-01	4.7E+00	1.8E-02	2.7E-01	2.7E-01	
Tributyltin	0	4.6E-01	7.2E-02	--	--	2.9E+00	2.6E+01	--	--	1.2E-01	1.8E-02	--	--	3.3E+01	6.4E+00	--	--	2.9E+00	6.4E+00	--	--	
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.6E+04	3.2E+04	--	--	3.5E+00	7.0E+00	--	--	1.6E+03	3.2E+03	--	--	1.6E+03	3.2E+03	
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	5.7E+03	1.6E+05	--	--	5.9E-01	1.6E+01	--	--	5.7E+02	1.6E+04	--	--	5.7E+02	1.6E+04	
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	2.4E+04	2.9E+05	--	--	2.5E+00	3.0E+01	--	--	2.4E+03	2.9E+04	--	--	2.4E+03	2.9E+04	
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	1.4E+04	2.3E+04	--	--	1.4E+00	2.4E+00	--	--	1.4E+03	2.3E+03	--	--	1.4E+03	2.3E+03	
2-(2,4,5-Trichlorophenoxy)propanoic acid (Silvex)	0	--	--	5.0E+01	--	--	--	2.3E+04	--	--	--	5.0E+00	--	--	--	2.3E+03	--	--	--	2.3E+03	--	
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	2.4E+02	2.3E+04	--	--	2.5E-02	2.4E+00	--	--	2.4E+01	2.3E+03	--	--	2.4E+01	2.3E+03	
Zinc	3.68	9.9E+01	9.6E+01	7.4E+03	2.6E+04	6.1E+02	3.3E+04	3.4E+06	1.2E+07	2.7E+01	2.7E+01	7.4E+02	2.6E+03	6.6E+03	8.2E+03	3.4E+05	1.2E+06	6.1E+02	8.2E+03	3.4E+05	1.2E+06	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.6E+02
Arsenic	4.5E+02
Barium	9.3E+04
Cadmium	9.0E+00
Chromium III	1.2E+03
Chromium VI	4.1E+01
Copper	2.7E+01
Iron	1.4E+04
Lead	2.4E+02
Manganese	1.7E+03
Mercury	3.6E+00
Nickel	3.9E+02
Selenium	5.1E+01
Silver	6.3E+00
Zinc	2.5E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

4/12/2010 1:57:15 PM

Facility = VA0000248 - 029

Chemical = Copper, Total

Chronic averaging period = 4

WLAa = 68

WLAc = 590

Q.L. = 10

# samples/mo. = 1

# samples/wk. = 1

**Summary of Statistics:**

# observations = 1

Expected Value = 12.7

Variance = 58.0644

C.V. = 0.6

97th percentile daily values = 30.9044

97th percentile 4 day average = 21.1301

97th percentile 30 day average= 15.3168

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

12.7

4/12/2010 1:58:05 PM

Facility = VA0000248 - 029  
Chemical = Lead, Total  
Chronic averaging period = 4  
WLAA = 590  
WLAC = 880  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 26.2  
Variance = 247.118  
C.V. = 0.6  
97th percentile daily values = 63.7555  
97th percentile 4 day average = 43.5913  
97th percentile 30 day average= 31.5985  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

26.2

4/12/2010 1:58:37 PM

Facility = VA0000248 - 029  
Chemical = Nickel, Total  
Chronic averaging period = 4  
WLAa = 980  
WLAc = 1400  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 10  
Variance = 36  
C.V. = 0.6  
97th percentile daily values = 24.3341  
97th percentile 4 day average = 16.6379  
97th percentile 30 day average= 12.0605  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

4/12/2010 1:59:22 PM

Facility = VA0000248 - 029  
Chemical = Zinc, Total  
Chronic averaging period = 4  
WLAA = 610  
WLAC = 8200  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 19.9  
Variance = 142.563  
C.V. = 0.6  
97th percentile daily values = 48.4250  
97th percentile 4 day average = 33.1094  
97th percentile 30 day average= 24.0004  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

19.9

4/12/2010 2:01:18 PM

Facility = VA0000248 - 029  
Chemical = Sulfate  
Chronic averaging period = 4  
WLAa =  
WLAc = 10000000  
Q.L. = 5  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 76.9  
Variance = 2128.89  
C.V. = 0.6  
97th percentile daily values = 187.129  
97th percentile 4 day average = 127.945  
97th percentile 30 day average= 92.7454  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

76.9

4/12/2010 2:02:48 PM

Facility = VA0000248 - 029  
Chemical = 2,4-Dinitrotoluene  
Chronic averaging period = 4  
WLAA =  
WLAC = 110  
Q.L. = 10  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 38.9  
Variance = 544.755  
C.V. = 0.6  
97th percentile daily values = 94.6599  
97th percentile 4 day average = 64.7214  
97th percentile 30 day average= 46.9154  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

38.9

**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Generic SW Outfall

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =		100 %		Mean Hardness (as CaCO <sub>3</sub> ) =		78 mg/L	
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =		100 %		90% Temp (Annual) =		23.3 deg C	
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =		100 %		90% Temp (Wet season) =		13.8 deg C	
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	529 MGD	Wet Season - 1Q10 Mix =		100 %		90% Maximum pH =		8.22 SU	
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1057 MGD	- 30Q10 Mix =		100 %		10% Maximum pH =		7.32 SU	
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD					Discharge Flow =		0 MGD	
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	6.7E+01	9.9E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	#DIV/0!	#DIV/0!	--	--	6.1E-01	9.3E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	#DIV/0!	#DIV/0!	--	--	5.1E-02	2.5E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	#DIV/0!	--	#DIV/0!	#DIV/0!	7.5E-01	--	4.9E-05	5.0E-05	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Ammonia-N (mg/l) (Yearly)	0	3.68E+00	9.86E-01	--	--	#DIV/0!	#DIV/0!	--	--	9.20E-01	2.46E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	#DIV/0!	#DIV/0!	--	--	9.20E-01	4.34E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	#DIV/0!	#DIV/0!	--	--	8.3E+02	4.0E+03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	#DIV/0!	#DIV/0!	--	--	5.6E-01	6.4E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Arsenic	0.35	3.4E+02	1.6E+02	1.0E+01	--	#DIV/0!	#DIV/0!	#DIV/0!	--	8.5E+01	3.8E+01	1.3E+00	--	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	--
Barium	0	--	--	2.0E+03	--	--	--	#DIV/0!	#DIV/0!	--	--	2.0E+02	--	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	#DIV/0!	#DIV/0!	--	--	2.2E+00	5.1E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	#DIV/0!	#DIV/0!	--	--	8.6E-05	2.0E-04	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Bis2-Chlorethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	#DIV/0!	#DIV/0!	--	--	3.0E-02	5.3E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	#DIV/0!	#DIV/0!	--	--	1.4E+02	6.5E+03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	#DIV/0!	#DIV/0!	--	--	1.2E+00	2.2E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Bromofom <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	#DIV/0!	#DIV/0!	--	--	4.3E+00	1.4E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	#DIV/0!	#DIV/0!	--	--	1.5E+02	1.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	#DIV/0!	#DIV/0!	#DIV/0!	--	7.4E-01	2.3E-01	5.0E-01	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	#DIV/0!	#DIV/0!	--	--	2.3E-01	1.6E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	6.0E-01	1.1E-03	8.0E-04	8.1E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	#DIV/0!	#DIV/0!	#DIV/0!	--	2.2E+05	6.3E+04	3.2E+04	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--
TRC	0	1.9E+01	1.1E+01	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	4.8E+00	2.8E+00	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	#DIV/0!	#DIV/0!	--	--	1.3E+01	1.6E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	#DIV/0!	#DIV/0!	--	--	4.0E-01	1.3E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	#DIV/0!	#DIV/0!	--	--	3.4E+01	1.1E+03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	#DIV/0!	#DIV/0!	--	--	1.0E+02	1.6E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	#DIV/0!	#DIV/0!	--	--	8.1E+00	1.5E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	#DIV/0!	#DIV/0!	--	--	2.1E-02	1.0E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Chromium III	0	4.6E+02	6.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	1.2E+02	1.5E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	#DIV/0!	#DIV/0!	--	--	4.0E+00	2.8E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	#DIV/0!	--	--	--	1.0E+01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-04	1.8E-03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3.1E+00	2.3E+00	1.3E+02	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.5E+00	1.3E+00	1.4E+01	1.6E+03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	#DIV/0!	#DIV/0!	--	--	3.1E-04	3.1E-04	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	#DIV/0!	#DIV/0!	--	--	2.2E-04	2.2E-04	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2.8E-01	2.5E-04	2.2E-04	2.2E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Demeton	0	--	1.0E-01	--	--	--	#DIV/0!	--	--	--	2.5E-02	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	#DIV/0!	#DIV/0!	--	--	4.3E-02	4.3E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	#DIV/0!	#DIV/0!	--	--	4.2E+01	1.3E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	#DIV/0!	#DIV/0!	--	--	3.2E+01	9.6E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	6.3E+00	1.9E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
3,3-Dichlorobenzidine <sup>b</sup>	0	--	--	2.1E-01	2.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	2.1E-02	2.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	#DIV/0!	#DIV/0!	--	--	5.5E-01	1.7E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-01	3.7E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	#DIV/0!	#DIV/0!	--	--	3.3E+01	7.1E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	#DIV/0!	#DIV/0!	--	--	1.4E+01	1.0E+03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	7.7E+00	2.9E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	#DIV/0!	--	--	--	1.0E+01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	
1,2-Dichloropropane <sup>b</sup>	0	--	--	5.0E+00	1.5E+02	--	--	#DIV/0!	#DIV/0!	--	--	5.0E-01	1.5E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	#DIV/0!	#DIV/0!	--	--	3.4E-01	2.1E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	6.0E-02	1.4E-02	5.2E-05	5.4E-05	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	#DIV/0!	#DIV/0!	--	--	1.7E+03	4.4E+03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	#DIV/0!	#DIV/0!	--	--	3.8E+01	8.5E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	#DIV/0!	#DIV/0!	--	--	2.7E+04	1.1E+05	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	#DIV/0!	#DIV/0!	--	--	2.0E+02	4.5E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	#DIV/0!	#DIV/0!	--	--	6.9E+00	5.3E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	#DIV/0!	#DIV/0!	--	--	1.3E+00	2.8E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	#DIV/0!	#DIV/0!	--	--	1.1E-01	3.4E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	#DIV/0!	#DIV/0!	--	--	5.0E-09	5.1E-09	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
1,2-Diphenylhydrazine <sup>b</sup>	0	--	--	3.6E-01	2.0E+00	--	--	#DIV/0!	#DIV/0!	--	--	3.6E-02	2.0E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.5E-02	1.4E-02	6.2E+00	8.9E+00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.5E-02	1.4E-02	6.2E+00	8.9E+00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	#DIV/0!	#DIV/0!	--	--	5.5E-02	1.4E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	#DIV/0!	#DIV/0!	--	--	6.2E+00	8.9E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2.2E-02	9.0E-03	5.9E-03	6.0E-03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	#DIV/0!	#DIV/0!	--	--	2.9E-02	3.0E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	#DIV/0!	#DIV/0!	--	--	5.3E+01	2.1E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!		
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	#DIV/0!	#DIV/0!	--	--	1.3E+01	1.4E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!		
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	#DIV/0!	#DIV/0!	--	--	1.1E+02	5.3E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!		
Foaming Agents	0	--	--	5.0E+02	--	--	--	#DIV/0!	--	--	--	5.0E+01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--		
Guthion	0	--	--	1.0E-02	--	--	--	#DIV/0!	--	--	--	2.5E-03	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--		
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.3E-01	9.5E-04	7.9E-05	7.9E-05	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.3E-01	9.5E-04	3.9E-05	3.9E-05	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
Hexachlorobenzene <sup>e</sup>	0	--	--	2.8E-03	2.9E-03	--	--	#DIV/0!	#DIV/0!	--	--	2.8E-04	2.9E-04	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!		
Hexachlorobutadiene <sup>f</sup>	0	--	--	--	4.4E+00	1.8E+02	--	--	#DIV/0!	#DIV/0!	--	--	4.4E-01	1.8E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	
Hexachlorocyclohexane																							
Alpha-BHC <sup>c</sup>	0	--	--	--	2.6E-02	4.9E-02	--	--	#DIV/0!	#DIV/0!	--	--	2.6E-03	4.9E-03	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	
Hexachlorocyclohexane Beta BHC <sup>c</sup>	0	--	--	--	9.1E-02	1.7E-01	--	--	#DIV/0!	#DIV/0!	--	--	9.1E-03	1.7E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	
Hexachlorocyclohexane Gamma-BHC <sup>c</sup> (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	#DIV/0!	--	#DIV/0!	#DIV/0!	2.4E-01	--	9.8E-02	1.8E-01	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	#DIV/0!	#DIV/0!	--	--	4.0E+00	1.1E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	#DIV/0!	#DIV/0!	--	--	1.4E+00	3.3E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Hydrogen Sulfide	0	--	--	2.0E+00	--	--	--	#DIV/0!	--	--	--	5.0E-01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	#DIV/0!	#DIV/0!	--	--	3.8E-03	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Iron	0	--	--	3.0E+02	--	--	--	#DIV/0!	--	--	--	3.0E+01	--	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	
Isophorone <sup>c</sup>	0	--	--	3.5E+02	9.6E+03	--	--	#DIV/0!	#DIV/0!	--	--	3.5E+01	9.6E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Kepone	0	--	--	0.0E+00	--	--	--	#DIV/0!	--	--	--	0.0E+00	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Lead	0	8.7E+01	9.8E+00	1.5E+01	--	#DIV/0!	#DIV/0!	#DIV/0!	--	2.2E+01	2.5E+00	1.5E+00	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	--	
Malathion	0	--	--	1.0E-01	--	--	--	#DIV/0!	--	--	--	2.5E-02	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Manganese	14.32	--	--	5.0E+01	--	--	--	#DIV/0!	#DIV/0!	--	--	1.8E+01	--	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	
Mercury	0	1.4E+00	7.7E-01	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	3.5E-01	1.9E-01	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!	--		
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	#DIV/0!	#DIV/0!	--	--	4.7E+00	1.5E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	#DIV/0!	#DIV/0!	--	--	4.6E+00	5.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!	
Methoxychlor	0	--	--	3.0E-02	1.0E+02	--	--	#DIV/0!	#DIV/0!	--	--	7.5E-03	1.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	
Mirex	0	--	--	0.0E+00	--	--	--	#DIV/0!	--	--	--	0.0E+00	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3.7E+01	4.4E+00	6.1E+01	4.6E+02	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	#DIV/0!	--	--	--	1.8E+03	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Nitrobenzene	0	--	--	--	1.7E+01	6.9E+02	--	--	#DIV/0!	#DIV/0!	--	--	1.7E+00	6.9E+01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!
N-Nitrosodimethylamine <sup>f</sup>	0	--	--	--	6.9E-03	3.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	6.9E-04	3.0E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!
N-Nitrosodiphenylamine <sup>f</sup>	0	--	--	--	3.3E+01	6.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	3.3E+00	6.0E+00	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!
N-Nitrosodi-n-propylamine <sup>f</sup>	0	--	--	--	5.0E-02	5.1E+00	--	--	#DIV/0!	#DIV/0!	--	--	5.0E-03	5.1E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!
Nonylphenol	0	2.8E+01	6.6E+00	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	7.0E+00	1.7E+00	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	--	--		
Parathion	0	6.5E-02	1.3E-02	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	1.6E-02	3.3E-03	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	--	--		
PCB Total <sup>c</sup>	0	--	--	1.4E-02	6.4E-04	6.4E-04	--	#DIV/0!	#DIV/0!	#DIV/0!	--	3.5E-03	6.4E-05	6.4E-05	--	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3.0E+00	2.3E+00	2.7E-01	3.0E+00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Phenol	0	--	--	--	1.0E+04	8.6E+05	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	1.0E+03	8.6E+04	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!
Pyrene	0	--	--	--	8.3E+02	4.0E+03	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	8.3E+01	4.0E+02	--	--	#DIV/0!	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!	#DIV/0!
Radionuclides																							
Gross Alpha Activity (pCi/L)	0	--	--	--	--	--	--	#DIV/0!	--	--	--	1.5E+00	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Beta and Photon Activity (mrem/yr)	0	--	--	--	4.0E+00	4.0E+00	--	--	#DIV/0!	#DIV/0!	--	--	4.0E-01	4.0E-01	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	#DIV/0!
Radium 226 + 228 (pCi/L)	0	--	--	--	5.0E+00	--	--	#DIV/0!	--	--	--	5.0E-01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	
Uranium (ug/l)	0	--	--	--	3.0E+01	--	--	#DIV/0!	--	--	--	3.0E+00	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.0E+00	1.3E+00	1.7E+01	4.2E+02	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Silver	0	2.3E+00	--	--	--	#DIV/0!	--	--	--	5.6E-01	--	--	--	#DIV/0!	--	--	--	#DIV/0!	--	--	--
Sulfate	7870	--	--	2.5E+05	--	--	--	#DIV/0!	#DIV/0!	--	--	--	3.2E+04	--	--	--	#DIV/0!	--	--	#DIV/0!	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	--	1.7E-01	4.0E+00	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	#DIV/0!	#DIV/0!	--	--	--	6.9E-01	3.3E+00	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	#DIV/0!	#DIV/0!	--	--	--	2.4E-02	4.7E-02	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	#DIV/0!	#DIV/0!	--	--	--	5.1E+01	6.0E+02	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Total dissolved solids	0	--	--	5.0E+05	--	--	--	#DIV/0!	--	--	--	--	5.0E+04	--	--	--	#DIV/0!	--	--	#DIV/0!	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.8E-01	5.0E-05	2.8E-04	2.8E-04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Tributyltin	0	4.6E-01	7.2E-02	--	--	#DIV/0!	#DIV/0!	--	--	1.2E-01	1.8E-02	--	--	#DIV/0!	#DIV/0!	--	--	#DIV/0!	#DIV/0!	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	#DIV/0!	#DIV/0!	--	--	--	3.5E+00	7.0E+00	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	#DIV/0!	#DIV/0!	--	--	--	5.9E-01	1.6E+01	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	#DIV/0!	#DIV/0!	--	--	--	2.5E+00	3.0E+01	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	#DIV/0!	#DIV/0!	--	--	--	1.4E+00	2.4E+00	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	#DIV/0!	--	--	--	--	5.0E+00	--	--	--	#DIV/0!	--	--	#DIV/0!	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	#DIV/0!	#DIV/0!	--	--	--	2.5E-02	2.4E+00	--	--	#DIV/0!	#DIV/0!	--	#DIV/0!	#DIV/0!
Zinc	3.68	9.5E+01	9.6E+01	7.4E+03	2.6E+04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2.6E+01	2.7E+01	7.4E+02	2.6E+03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	#DIV/0!
Arsenic	#DIV/0!
Barium	#DIV/0!
Cadmium	#DIV/0!
Chromium III	#DIV/0!
Chromium VI	#DIV/0!
Copper	#DIV/0!
Iron	#DIV/0!
Lead	#DIV/0!
Manganese	#DIV/0!
Mercury	#DIV/0!
Nickel	#DIV/0!
Selenium	#DIV/0!
Silver	#DIV/0!
Zinc	#DIV/0!

Note: do not use QL's lower than the minimum QL's provided in agency guidance

**FRESHWATER**  
**WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: RAAP - Outfall 999

Permit No.: VA0000248

Receiving Stream: New River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L	1Q10 (Annual) =	449 MGD	Annual - 1Q10 Mix =	100 %			Mean Hardness (as CaCO <sub>3</sub> ) =	78 mg/L		
90% Temperature (Annual) =	23.3 deg C	7Q10 (Annual) =	559 MGD	- 7Q10 Mix =	100 %			90% Temp (Annual) =	23.3 deg C		
90% Temperature (Wet season) =	13.8 deg C	30Q10 (Annual) =	646 MGD	- 30Q10 Mix =	100 %			90% Temp (Wet season) =	13.8 deg C		
90% Maximum pH =	8.22 SU	1Q10 (Wet season) =	528 MGD	Wet Season - 1Q10 Mix =	100 %			90% Maximum pH =	8.22 SU		
10% Maximum pH =	7.32 SU	30Q10 (Wet season) =	1067 MGD	- 30Q10 Mix =	100 %			10% Maximum pH =	7.32 SU		
Tier Designation (1 or 2) =	2	30Q5 =	726 MGD					Discharge Flow =	22 MGD		
Public Water Supply (PWS) Y/N? =	y	Harmonic Mean =	1520 MGD								
Trout Present Y/N? =	y										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	2.3E+04	3.4E+04	--	--	6.7E+01	9.9E+01	--	--	2.3E+03	3.4E+03	--	--	2.3E+03	3.4E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	2.1E+02	3.2E+02	--	--	6.1E-01	9.3E-01	--	--	2.1E+01	3.2E+01	--	--	2.1E+01	3.2E+01
Acrylonitrile <sup>c</sup>	0	--	--	5.1E-01	2.5E+00	--	--	3.6E+01	1.8E+02	--	--	5.1E-02	2.5E-01	--	--	3.6E+00	1.8E+01	--	--	3.6E+00	1.8E+01
Aldrin <sup>c</sup>	0	3.0E+00	--	4.9E-04	5.0E-04	6.4E+01	--	3.4E-02	3.5E-02	7.5E-01	--	4.9E-05	5.0E-05	1.6E+01	--	3.4E-03	3.5E-03	1.6E+01	--	3.4E-03	3.5E-03
Ammonia-N (mg/l) (Yearly)	0	3.68E+00	9.86E-01	--	--	7.9E+01	3.0E+01	--	--	9.20E-01	2.46E-01	--	--	2.0E+01	7.5E+00	--	--	2.0E+01	7.5E+00	--	--
Ammonia-N (mg/l) (High Flow)	0	3.68E+00	1.74E+00	--	--	9.2E+01	8.6E+01	--	--	9.20E-01	4.34E-01	--	--	2.3E+01	2.1E+01	--	--	2.3E+01	2.1E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	2.8E+05	1.4E+06	--	--	8.3E+02	4.0E+03	--	--	2.8E+04	1.4E+05	--	--	2.8E+04	1.4E+05
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	1.9E+02	2.2E+04	--	--	5.6E-01	6.4E+01	--	--	1.9E+01	2.2E+03	--	--	1.9E+01	2.2E+03
Arsenic	0.35	3.4E+02	1.5E+02	1.0E+01	--	7.3E+03	4.0E+03	3.3E+02	--	8.5E+01	3.8E+01	1.3E+00	--	1.8E+03	9.9E+02	3.3E+01	--	1.8E+03	9.9E+02	3.3E+01	--
Barium	0	--	--	2.0E+03	--	--	--	6.8E+04	--	--	--	2.0E+02	--	--	--	6.8E+03	--	--	--	6.8E+03	--
Benzene <sup>c</sup>	0	--	--	2.2E+01	5.1E+02	--	--	1.5E+03	3.6E+04	--	--	2.2E+00	5.1E+01	--	--	1.5E+02	3.6E+03	--	--	1.5E+02	3.6E+03
Benzidine <sup>c</sup>	0	--	--	8.6E-04	2.0E-03	--	--	6.0E-02	1.4E-01	--	--	8.6E-05	2.0E-04	--	--	6.0E-03	1.4E-02	--	--	6.0E-03	1.4E-02
Benzo (a) anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00
Benzo (a) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00
Bis2-Chloroethyl Ether <sup>c</sup>	0	--	--	3.0E-01	5.3E+00	--	--	2.1E+01	3.7E+02	--	--	3.0E-02	5.3E-01	--	--	2.1E+00	3.7E+01	--	--	2.1E+00	3.7E+01
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	4.6E+04	2.2E+06	--	--	1.4E+02	6.5E+03	--	--	4.8E+03	2.2E+05	--	--	4.8E+03	2.2E+05
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	1.2E+01	2.2E+01	--	--	6.4E+02	1.5E+03	--	--	1.2E+00	2.2E+00	--	--	8.4E+01	1.5E+02	--	--	8.4E+01	1.5E+02
Bromoform <sup>c</sup>	0	--	--	4.3E+01	1.4E+03	--	--	3.0E+03	9.8E+04	--	--	4.3E+00	1.4E+02	--	--	3.0E+02	9.8E+03	--	--	3.0E+02	9.8E+03
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	5.1E+04	6.5E+04	--	--	1.5E+02	1.9E+02	--	--	5.1E+03	6.5E+03	--	--	5.1E+03	6.5E+03
Cadmium	0	3.0E+00	9.3E-01	5.0E+00	--	6.3E+01	2.5E+01	1.7E+02	--	7.4E-01	2.3E-01	5.0E-01	--	1.6E+01	6.2E+00	1.7E+01	--	1.6E+01	6.2E+00	1.7E+01	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	2.3E+00	1.6E+01	--	--	1.6E+02	1.1E+03	--	--	2.3E-01	1.6E+00	--	--	1.6E+01	1.1E+02	--	--	1.6E+01	1.1E+02
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	5.1E+01	1.1E-01	5.6E-01	5.7E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	1.3E+01	2.8E-02	5.6E-02	5.7E-02	1.3E+01	2.8E-02	5.6E-02	5.7E-02
Chloride	7960	8.6E+05	2.3E+05	2.5E+05	--	1.8E+07	5.9E+06	8.2E+06	--	2.2E+05	6.3E+04	3.2E+04	--	4.6E+06	1.5E+06	8.3E+05	--	4.6E+06	1.5E+06	8.3E+05	--
TRC	0	1.9E+01	1.1E+01	--	--	4.1E+02	2.9E+02	--	--	4.8E+00	2.8E+00	--	--	1.0E+02	7.3E+01	--	--	1.0E+02	7.3E+01	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	4.4E+03	5.4E+04	--	--	1.3E+01	1.6E+02	--	--	4.4E+02	5.4E+03	--	--	4.4E+02	5.4E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Chlorodibromomethane <sup>b</sup>	0	--	--	4.0E+00	1.3E+02	--	--	2.8E+02	9.1E+03	--	--	4.0E-01	1.3E+01	--	--	2.8E+01	9.1E+02	--	--	2.8E+01	9.1E+02	
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.2E+04	3.7E+05	--	--	3.4E+01	1.1E+03	--	--	1.2E+03	3.7E+04	--	--	1.2E+03	3.7E+04	
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	3.4E+04	5.4E+04	--	--	1.0E+02	1.6E+02	--	--	3.4E+03	5.4E+03	--	--	3.4E+03	5.4E+03	
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	2.8E+03	5.1E+03	--	--	8.1E+00	1.5E+01	--	--	2.8E+02	5.1E+02	--	--	2.8E+02	5.1E+02	
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.8E+00	1.1E+00	--	--	2.1E-02	1.0E-02	--	--	4.4E-01	2.7E-01	--	--	4.4E-01	2.7E-01	--	--	
Chromium III	0	4.6E+02	6.0E+01	--	--	1.0E+04	1.6E+03	--	--	1.2E+02	1.5E+01	--	--	2.5E+03	4.0E+02	--	--	2.5E+03	4.0E+02	--	--	
Chromium VI	0	1.6E+01	1.1E+01	--	--	3.4E+02	2.9E+02	--	--	4.0E+00	2.8E+00	--	--	8.6E+01	7.3E+01	--	--	8.6E+01	7.3E+01	--	--	
Chromium, Total	0.18	--	--	1.0E+02	--	--	--	3.4E+03	--	--	--	1.0E+01	--	--	--	3.4E+02	--	--	--	3.4E+02	--	
Chrysene <sup>c</sup>	0	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	3.8E-04	1.8E-03	--	--	2.7E-02	1.3E-01	--	--	2.7E-02	1.3E-01	
Copper	0.65	1.1E+01	7.2E+00	1.3E+03	--	2.1E+02	1.7E+02	4.4E+04	--	3.1E+00	2.3E+00	1.3E+02	--	5.4E+01	4.4E+01	4.4E+03	--	5.4E+01	4.4E+01	4.4E+03	--	
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	4.7E+02	1.4E+02	4.8E+03	5.4E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	1.2E+02	3.4E+01	4.8E+02	1.2E+02	3.4E+01	4.8E+02	5.4E+04	--	
DDD <sup>c</sup>	0	--	--	3.1E-03	3.1E-03	--	--	2.2E-01	2.2E-01	--	--	3.1E-04	3.1E-04	--	--	2.2E-02	2.2E-02	--	--	2.2E-02	2.2E-02	
DDE <sup>c</sup>	0	--	--	2.2E-03	2.2E-03	--	--	1.5E-01	1.5E-01	--	--	2.2E-04	2.2E-04	--	--	1.5E-02	1.5E-02	--	--	1.5E-02	1.5E-02	
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.4E+01	2.6E-02	1.5E-01	1.5E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	5.9E+00	6.6E-03	1.5E-02	1.5E-02	5.9E+00	6.6E-03	1.5E-02	1.5E-02	
Demeton	0	--	--	1.0E-01	--	--	--	2.6E+00	--	--	--	2.5E-02	--	--	--	6.6E-01	--	--	--	6.6E-01	--	
Diazinon	0	1.7E-01	1.7E-01	--	--	3.6E+00	4.5E+00	--	--	4.3E-02	4.3E-02	--	--	9.1E-01	1.1E+00	--	--	9.1E-01	1.1E+00	--	--	
Dibenzo(a,h)anthracene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00	
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.4E+04	4.4E+04	--	--	4.2E+01	1.3E+02	--	--	1.4E+03	4.4E+03	--	--	1.4E+03	4.4E+03	
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.1E+04	3.3E+04	--	--	3.2E+01	9.6E+01	--	--	1.1E+03	3.3E+03	--	--	1.1E+03	3.3E+03	
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	2.1E+03	6.5E+03	--	--	6.3E+00	1.9E+01	--	--	2.1E+02	6.5E+02	--	--	2.1E+02	6.5E+02	
3,3-Dichlorobenzidine <sup>b</sup>	0	--	--	2.1E-01	2.8E-01	--	--	1.5E+01	2.0E+01	--	--	2.1E-02	2.8E-02	--	--	1.5E+00	2.0E+00	--	--	1.5E+00	2.0E+00	
Dichlorobromomethane <sup>c</sup>	0	--	--	5.5E+00	1.7E+02	--	--	3.9E+02	1.2E+04	--	--	5.5E-01	1.7E+01	--	--	3.9E+01	1.2E+03	--	--	3.9E+01	1.2E+03	
1,2-Dichloroethane <sup>c</sup>	0	--	--	3.8E+00	3.7E+02	--	--	2.7E+02	2.6E+04	--	--	3.8E-01	3.7E+01	--	--	2.7E+01	2.6E+03	--	--	2.7E+01	2.6E+03	
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.1E+04	2.4E+05	--	--	3.3E+01	7.1E+02	--	--	1.1E+03	2.4E+04	--	--	1.1E+03	2.4E+04	
1,2-Trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	4.8E+03	3.4E+05	--	--	1.4E+01	1.0E+03	--	--	4.8E+02	3.4E+04	--	--	4.8E+02	3.4E+04	
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	2.6E+03	9.9E+03	--	--	7.7E+00	2.9E+01	--	--	2.6E+02	9.9E+02	--	--	2.6E+02	9.9E+02	
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	3.4E+03	--	--	--	1.0E+01	--	--	--	3.4E+02	--	--	--	3.4E+02	--	
1,2-Dichloropropane <sup>b</sup>	0	--	--	5.0E+00	1.5E+02	--	--	3.5E+02	1.1E+04	--	--	5.0E-01	1.5E+01	--	--	3.5E+01	1.1E+03	--	--	3.5E+01	1.1E+03	
1,3-Dichloropropene <sup>c</sup>	0	--	--	3.4E+00	2.1E+02	--	--	2.4E+02	1.5E+04	--	--	3.4E-01	2.1E+01	--	--	2.4E+01	1.5E+03	--	--	2.4E+01	1.5E+03	
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	5.1E+00	1.5E+00	3.6E-02	3.8E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	1.3E+00	3.7E-01	3.6E-03	3.8E-03	1.3E+00	3.7E-01	3.6E-03	3.8E-03	
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	5.8E+05	1.5E+06	--	--	1.7E+03	4.4E+03	--	--	5.8E+04	1.5E+05	--	--	5.8E+04	1.5E+05	
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	1.3E+04	2.9E+04	--	--	3.8E+01	8.5E+01	--	--	1.3E+03	2.9E+03	--	--	1.3E+03	2.9E+03	
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	9.2E+06	3.7E+07	--	--	2.7E+04	1.1E+05	--	--	9.2E+05	3.7E+06	--	--	9.2E+05	3.7E+06	
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	6.8E+04	1.5E+05	--	--	2.0E+02	4.5E+02	--	--	6.8E+03	1.5E+04	--	--	6.8E+03	1.5E+04	
2,4-Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	2.3E+03	1.8E+05	--	--	6.9E+00	5.3E+02	--	--	2.3E+02	1.8E+04	--	--	2.3E+02	1.8E+04	
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	4.4E+02	9.5E+03	--	--	1.3E+00	2.8E+01	--	--	4.4E+01	9.5E+02	--	--	4.4E+01	9.5E+02	
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	1.1E+00	3.4E+01	--	--	7.7E+01	2.4E+03	--	--	1.1E-01	3.4E+00	--	--	7.7E+00	2.4E+02	--	--	7.7E+00	2.4E+02	
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	1.7E-06	1.7E-06	--	--	5.0E-09	5.1E-09	--	--	1.7E-07	1.7E-07	--	--	1.7E-07	1.7E-07	
1,2-Diphenylhydrazine <sup>b</sup>	0	--	--	3.6E-01	2.0E+00	--	--	2.5E+01	1.4E+02	--	--	3.6E-02	2.0E-01	--	--	2.5E+00	1.4E+01	--	--	2.5E+00	1.4E+01	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.7E+00	1.5E+00	2.1E+03	3.0E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.2E+00	3.7E-01	2.1E+02	3.0E+02	1.2E+00	3.7E-01	2.1E+02	3.0E+02	
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.7E+00	1.5E+00	2.1E+03	3.0E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.2E+00	3.7E-01	2.1E+02	3.0E+02	1.2E+00	3.7E-01	2.1E+02	3.0E+02	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.7E+00	1.5E+00	--	--	5.5E-02	1.4E-02	--	--	1.2E+00	3.7E-01	--	--	1.2E+00	3.7E-01	--	--	
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	2.1E+03	3.0E+03	--	--	6.2E+00	8.9E+00	--	--	2.1E+02	3.0E+02	--	--	2.1E+02	3.0E+02	
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.8E+00	9.5E-01	2.0E+00	2.0E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	4.6E-01	2.4E-01	2.0E-01	4.6E-01	2.4E-01	2.0E-01	4.6E-01	2.0E-01	
Endrin Aldehyde	0	--	--	--	2.9E-01	3.0E-01	--	--	9.9E+00	1.0E+01	--	--	2.9E-02	3.0E-02	--	--	9.9E-01	1.0E+00	--	--	9.9E-01	1.0E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	1.8E+04	7.1E+04	--	--	5.3E+01	2.1E+02	--	--	1.8E+03	7.1E+03	--	--	1.8E+03	7.1E+03	
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	4.4E+03	4.8E+03	--	--	1.3E+01	1.4E+01	--	--	4.4E+02	4.8E+02	--	--	4.4E+02	4.8E+02	
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	3.7E+04	1.8E+05	--	--	1.1E+02	5.3E+02	--	--	3.7E+03	1.8E+04	--	--	3.7E+03	1.8E+04	
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.7E+04	--	--	--	5.0E+01	--	--	--	1.7E+03	--	--	--	1.7E+03	--	
Guthion	0	--	1.0E-02	--	--	--	2.6E-01	--	--	--	2.5E-03	--	--	--	6.6E-02	--	--	--	6.6E-02	--	--	
Heptachlor <sup>c</sup>	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.1E+01	1.0E-01	5.5E-02	5.5E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	2.8E+00	2.5E-02	5.5E-03	5.5E-03	2.8E+00	2.5E-02	5.5E-03	5.5E-03	
Heptachlor Epoxide <sup>d</sup>	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.1E+01	1.0E-01	2.7E-02	2.7E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	2.8E+00	2.5E-02	2.7E-03	2.7E-03	2.8E+00	2.5E-02	2.7E-03	2.7E-03	
Hexachlorobenzene <sup>e</sup>	0	--	--	2.8E-03	2.9E-03	--	--	2.0E-01	2.0E-01	--	--	2.8E-04	2.9E-04	--	--	2.0E-02	2.0E-02	--	--	2.0E-02	2.0E-02	
Hexachlorobutadiene <sup>f</sup>	0	--	--	4.4E+00	1.8E+02	--	--	3.1E+02	1.3E+04	--	--	4.4E-01	1.8E+01	--	--	3.1E+01	1.3E+03	--	--	3.1E+01	1.3E+03	
Hexachlorocyclohexane																						
Alpha-BHC <sup>c</sup>	0	--	--	2.6E-02	4.9E-02	--	--	1.8E+00	3.4E+00	--	--	2.6E-03	4.9E-03	--	--	1.8E-01	3.4E-01	--	--	1.8E-01	3.4E-01	
Hexachlorocyclohexane Beta																						
BHC <sup>c</sup>	0	--	--	9.1E-02	1.7E-01	--	--	6.4E+00	1.2E+01	--	--	9.1E-03	1.7E-02	--	--	6.4E-01	1.2E+00	--	--	6.4E-01	1.2E+00	
Hexachlorocyclohexane																						
Gamma-BHC <sup>c</sup> (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	2.0E+01	--	6.9E+01	1.3E+02	2.4E-01	--	9.8E-02	1.8E-01	5.1E+00	--	6.9E+00	1.3E+01	5.1E+00	--	6.9E+00	1.3E+01	
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.4E+03	3.7E+04	--	--	4.0E+00	1.1E+02	--	--	1.4E+02	3.7E+03	--	--	1.4E+02	3.7E+03	
Hexachloroethane <sup>f</sup>	0	--	--	1.4E+01	3.3E+01	--	--	9.8E+02	2.3E+03	--	--	1.4E+00	3.3E+00	--	--	9.8E+01	2.3E+02	--	--	9.8E+01	2.3E+02	
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	5.3E+01	--	--	--	5.0E-01	--	--	--	1.3E+01	--	--	--	1.3E+01	--	--	
Indeno (1,2,3-cd) pyrene <sup>c</sup>	0	--	--	3.8E-02	1.8E-01	--	--	2.7E+00	1.3E+01	--	--	3.8E-03	1.8E-02	--	--	2.7E-01	1.3E+00	--	--	2.7E-01	1.3E+00	
Iron	0	--	--	3.0E+02	--	--	--	1.0E+04	--	--	--	3.0E+01	--	--	--	1.0E+03	--	--	--	1.0E+03	--	
Isophorone <sup>c</sup>	0	--	--	3.5E+02	9.6E+03	--	--	2.5E+04	6.7E+05	--	--	3.5E+01	9.6E+02	--	--	2.5E+03	6.7E+04	--	--	2.5E+03	6.7E+04	
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Lead	0	8.7E+01	9.8E+00	1.5E+01	--	1.9E+03	2.6E+02	5.1E+02	--	2.2E+01	2.5E+00	1.5E+00	--	4.6E+02	6.5E+01	5.1E+01	--	4.6E+02	6.5E+01	5.1E+01	--	
Malathion	0	--	--	1.0E-01	--	--	--	2.6E+00	--	--	--	2.5E-02	--	--	--	6.6E-01	--	--	--	6.6E-01	--	--
Manganese	14.32	--	--	5.0E+01	--	--	--	1.2E+03	--	--	--	1.8E+01	--	--	--	1.4E+02	--	--	--	1.4E+02	--	--
Mercury	0	1.4E+00	7.7E-01	--	--	3.0E+01	2.0E+01	--	--	3.5E-01	1.9E-01	--	--	7.5E+00	5.1E+00	--	--	7.5E+00	5.1E+00	--	--	
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	1.6E+03	5.1E+04	--	--	4.7E+00	1.5E+02	--	--	1.6E+02	5.1E+03	--	--	1.6E+02	5.1E+03	
Methylene Chloride <sup>c</sup>	0	--	--	4.6E+01	5.9E+03	--	--	3.2E+03	4.1E+05	--	--	4.6E+00	5.9E+02	--	--	3.2E+02	4.1E+04	--	--	3.2E+02	4.1E+04	
Methoxychlor	0	--	--	3.0E-02	1.0E+02	--	--	7.9E-01	3.4E+03	--	--	7.5E-03	1.0E+01	--	--	2.0E-01	3.4E+02	--	--	2.0E-01	3.4E+02	
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	
Nickel	0.39	1.5E+02	1.6E+01	6.1E+02	4.6E+03	3.2E+03	4.2E+02	2.1E+04	1.6E+05	3.7E+01	4.4E+00	6.1E+01	4.6E+02	7.9E+02	1.1E+02	2.1E+03	1.6E+04	7.9E+02	1.1E+02	2.1E+03	1.6E+04	
Nitrate (as N)	890	--	--	1.0E+04	--	--	--	3.1E+05	--	--	--	1.8E+03	--	--	--	3.2E+04	--	--	--	3.2E+04	--	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	5.8E+02	2.3E+04	--	--	1.7E+00	6.9E+01	--	--	5.8E+01	2.3E+03	--	--	5.8E+01	2.3E+03	
N-Nitrosodimethylamine <sup>f</sup>	0	--	--	6.9E-03	3.0E+01	--	--	4.8E-01	2.1E+03	--	--	6.9E-04	3.0E+00	--	--	4.8E-02	2.1E+02	--	--	4.8E-02	2.1E+02	
N-Nitrosodiphenylamine <sup>f</sup>	0	--	--	3.3E+01	6.0E+01	--	--	2.3E+03	4.2E+03	--	--	3.3E+00	6.0E+00	--	--	2.3E+02	4.2E+02	--	--	2.3E+02	4.2E+02	
N-Nitrosodi-n-propylamine <sup>f</sup>	0	--	--	5.0E-02	5.1E+00	--	--	3.5E+00	3.6E+02	--	--	5.0E-03	5.1E-01	--	--	3.5E-01	3.6E+01	--	--	3.5E-01	3.6E+01	
Nonylphenol	0	2.8E+01	6.6E+00	--	--	6.0E+02	1.7E+02	--	--	7.0E+00	1.7E+00	--	--	1.5E+02	4.4E+01	--	--	1.5E+02	4.4E+01	--	--	
Parathion	0	6.5E-02	1.3E-02	--	--	1.4E+00	3.4E-01	--	--	1.6E-02	3.3E-03	--	--	3.5E-01	8.6E-02	--	--	3.5E-01	8.6E-02	--	--	
PCB Total <sup>f</sup>	0	--	1.4E-02	6.4E-04	6.4E-04	--	3.7E-01	4.5E-02	4.5E-02	--	3.5E-03	6.4E-05	6.4E-05	--	9.2E-02	4.5E-03	4.5E-03	--	9.2E-02	4.5E-03	4.5E-03	
Pentachlorophenol <sup>c</sup>	0	1.2E+01	9.2E+00	2.7E+00	3.0E+01	2.6E+02	2.4E+02	1.9E+02	2.1E+03	3.0E+00	2.3E+00	2.7E-01	3.0E+00	--	6.4E+01	6.1E+01	1.9E+01	2.1E+02	6.4E+01	6.1E+01	1.9E+01	
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	3.4E+05	2.9E+07	--	--	1.0E+03	8.6E+04	--	--	3.4E+04	2.9E+06	--	--	3.4E+04	2.9E+06	
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	2.8E+04	1.4E+05	--	--	8.3E+01	4.0E+02	--	--	2.8E+03	1.4E+04	--	--	2.8E+03	1.4E+04	
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	5.1E+02	--	--	--	1.5E+00	--	--	--	5.1E+01	--	--	--	5.1E+01	--	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.4E+02	1.4E+02	--	--	4.0E-01	4.0E-01	--	--	1.4E+01	1.4E+01	--	--	1.4E+01	1.4E+01	
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	1.7E+02	--	--	--	5.0E-01	--	--	--	1.7E+01	--	--	--	1.7E+01	--	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.0E+03	--	--	--	3.0E+00	--	--	--	1.0E+02	--	--	--	1.0E+02	--	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	4.3E+02	1.3E+02	5.8E+03	1.4E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	1.1E+02	3.3E+01	5.8E+02	1.4E+04	1.1E+02	3.3E+01	5.8E+02	1.4E+04
Silver	0	2.3E+00	--	--	--	4.8E+01	--	--	--	5.6E-01	--	--	--	1.2E+01	--	--	--	1.2E+01	--	--	--
Sulfate	7870	--	--	2.5E+05	--	--	--	8.2E+06	--	--	--	3.2E+04	--	--	--	8.3E+05	--	--	--	8.3E+05	--
1,1,2,2-Tetrachloroethane <sup>c</sup>	0	--	--	1.7E+00	4.0E+01	--	--	1.2E+02	2.8E+03	--	--	1.7E-01	4.0E+00	--	--	1.2E+01	2.8E+02	--	--	1.2E+01	2.8E+02
Tetrachloroethylene <sup>c</sup>	0	--	--	6.9E+00	3.3E+01	--	--	4.8E+02	2.3E+03	--	--	6.9E-01	3.3E+00	--	--	4.8E+01	2.3E+02	--	--	4.8E+01	2.3E+02
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	8.2E+00	1.6E+01	--	--	2.4E-02	4.7E-02	--	--	8.2E-01	1.6E+00	--	--	8.2E-01	1.6E+00
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	1.7E+04	2.0E+05	--	--	5.1E+01	6.0E+02	--	--	1.7E+03	2.0E+04	--	--	1.7E+03	2.0E+04
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.7E+07	--	--	--	5.0E+04	--	--	--	1.7E+06	--	--	--	1.7E+06	--
Toxaphene <sup>c</sup>	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.6E+01	5.3E-03	2.0E-01	2.0E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	3.9E+00	1.3E-03	2.0E-02	2.0E-02	3.9E+00	1.3E-03	2.0E-02	2.0E-02
Tributyltin	0	4.6E-01	7.2E-02	--	--	9.8E+00	1.9E+00	--	--	1.2E-01	1.8E-02	--	--	2.5E+00	4.8E-01	--	--	2.5E+00	4.8E-01	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.2E+03	2.4E+03	--	--	3.5E+00	7.0E+00	--	--	1.2E+02	2.4E+02	--	--	1.2E+02	2.4E+02
1,1,2-Trichloroethane <sup>c</sup>	0	--	--	5.9E+00	1.6E+02	--	--	4.1E+02	1.1E+04	--	--	5.9E-01	1.6E+01	--	--	4.1E+01	1.1E+03	--	--	4.1E+01	1.1E+03
Trichloroethylene <sup>c</sup>	0	--	--	2.5E+01	3.0E+02	--	--	1.8E+03	2.1E+04	--	--	2.5E+00	3.0E+01	--	--	1.8E+02	2.1E+03	--	--	1.8E+02	2.1E+03
2,4,6-Trichlorophenol <sup>c</sup>	0	--	--	1.4E+01	2.4E+01	--	--	9.8E+02	1.7E+03	--	--	1.4E+00	2.4E+00	--	--	9.8E+01	1.7E+02	--	--	9.8E+01	1.7E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.7E+03	--	--	--	5.0E+00	--	--	--	1.7E+02	--	--	--	1.7E+02	--
Vinyl Chloride <sup>c</sup>	0	--	--	2.5E-01	2.4E+01	--	--	1.8E+01	1.7E+03	--	--	2.5E-02	2.4E+00	--	--	1.8E+00	1.7E+02	--	--	1.8E+00	1.7E+02
Zinc	3.68	9.5E+01	9.6E+01	7.4E+03	2.6E+04	2.0E+03	2.4E+03	2.5E+05	8.8E+05	2.6E+01	2.7E+01	7.4E+02	2.6E+03	4.9E+02	6.1E+02	2.5E+04	8.8E+04	4.9E+02	6.1E+02	2.5E+04	8.8E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.9E+01
Arsenic	3.3E+01
Barium	6.8E+03
Cadmium	3.7E+00
Chromium III	2.4E+02
Chromium VI	3.4E+01
Copper	2.2E+01
Iron	1.0E+03
Lead	3.9E+01
Manganese	1.4E+02
Mercury	3.0E+00
Nickel	6.4E+01
Selenium	2.0E+01
Silver	4.8E+00
Zinc	2.0E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

modout - Complete1.txt  
 "Model Run For I:\kaharlow\Raap - VA0000248\VA0000248\_10\_Reissuance\Technical\DO Models\Complete1.mod On  
 4/16/2010 2:08:48 PM"  
 "Model is for NEW RIVER."  
 "Model starts at the OUTFALL 029 discharge."  
 "Background Data"  
 "7Q10", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 559, 2, 0, 8.801, 13.5  
 "Discharge/Tributary Input Data for Segment 1"  
 "Flow", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 1.57, 60, 0, .7, 20  
 "Hydraulic Information for Segment 1"  
 "Length", "Width", "Depth", "Velocity"  
 "(mi)", "(ft)", "(ft)", "(ft/sec)"  
 .1, 500, 1.472, 1.179  
 "Initial Mix Values for Segment 1"  
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 560.57, 8.796, 5.406, 0, 9.775, 13.5182  
 "Rate Constants for Segment 1. - (All units Per Day)"  
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"  
 1, .743, 3, 2.573, .35, .213, 0, 0  
 "Output for Segment 1"  
 "Segment starts at OUTFALL 029"  
 "Total", "Segm."  
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"  
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"  
 0, 0, 8.796, 5.406, 0  
 .1, .1, 8.788, 5.385, 0  
 "Discharge/Tributary Input Data for Segment 2"  
 "Flow", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 1, 30, 13.6, .5, 20  
 "Incremental Flow Input Data for Segment 2"  
 "Flow", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 0, 2, 0, 8.795, 13.5  
 "Hydraulic Information for Segment 2"  
 "Length", "Width", "Depth", "Velocity"  
 "(mi)", "(ft)", "(ft)", "(ft/sec)"  
 .02, 600.001, 1.016, .922  
 "Initial Mix Values for Segment 2"  
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 561.57, 8.781, 5.509, .082, 9.772, 13.52975  
 "Rate Constants for Segment 2. - (All units Per Day)"  
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"  
 .5, .371, 2.999, 2.573, .15, .091, 0, 0  
 "Output for Segment 2"  
 "Segment starts at OUTFALL 026"  
 "Total", "Segm."  
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"  
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"  
 .1, 0, 8.781, 5.509, .082  
 .12, .02, 8.782, 5.506, .082  
 "Discharge/Tributary Input Data for Segment 3"  
 "Flow", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"

modout - Complete1.txt

5.55, 24, 0, , 7, 20

"Incremental Flow Input Data for Segment 3"  
 "Flow", "cBOD5", "TKN", "DO", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 0, 2, 0, 8.787, 13.5

"Hydraulic Information for Segment 3"  
 "Length", "Width", "Depth", "Velocity"  
 "(mi)", "(ft)", "(ft)", "(ft/sec)"  
 4.88, 599.999, 1.025, .927

"Initial Mix Values for Segment 3"  
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"  
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
 567.12, 8.765, 6.039, .081, 9.763, 13.59307

"Rate Constants for Segment 3. - (All units Per Day)"  
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"  
 .5, .373, 3, 2.577, .15, .092, 0, 0

"Output for Segment 3"  
 "Segment starts at OUTFALL 007"  
 "Total", "Segm."  
 "Dist.", "Dist:", "DO", "cBOD", "nBOD"  
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"  
 .12, 0, 8.765, 6.039, .081  
 .22, .1, 8.767, 6.024, .081  
 .32, .2, 8.769, 6.009, .081  
 .42, .3, 8.771, 5.994, .081  
 .52, .4, 8.773, 5.979, .081  
 .62, .5, 8.775, 5.964, .081  
 .72, .6, 8.777, 5.949, .081  
 .82, .7, 8.779, 5.934, .081  
 .92, .8, 8.781, 5.919, .081  
 1.02, .9, 8.783, 5.904, .081  
 1.12, 1, 8.785, 5.89, .081  
 1.22, 1.1, 8.787, 5.876, .081  
 1.32, 1.2, 8.787, 5.862, .081  
 1.42, 1.3, 8.787, 5.848, .081  
 1.52, 1.4, 8.787, 5.834, .081  
 1.62, 1.5, 8.787, 5.82, .081  
 1.72, 1.6, 8.787, 5.806, .081  
 1.82, 1.7, 8.787, 5.792, .081  
 1.92, 1.8, 8.787, 5.778, .081  
 2.02, 1.9, 8.787, 5.764, .081  
 2.12, 2, 8.787, 5.75, .081  
 2.22, 2.1, 8.787, 5.736, .081  
 2.32, 2.2, 8.787, 5.722, .081  
 2.42, 2.3, 8.787, 5.708, .081  
 2.52, 2.4, 8.787, 5.694, .081  
 2.62, 2.5, 8.787, 5.68, .081  
 2.72, 2.6, 8.787, 5.666, .081  
 2.82, 2.7, 8.787, 5.652, .081  
 2.92, 2.8, 8.787, 5.638, .081  
 3.02, 2.9, 8.787, 5.624, .081  
 3.12, 3, 8.787, 5.61, .081  
 3.22, 3.1, 8.787, 5.596, .081  
 3.32, 3.2, 8.787, 5.582, .081  
 3.42, 3.3, 8.787, 5.568, .081  
 3.52, 3.4, 8.787, 5.554, .081  
 3.62, 3.5, 8.787, 5.54, .081  
 3.72, 3.6, 8.787, 5.526, .081  
 3.82, 3.7, 8.787, 5.512, .081  
 3.92, 3.8, 8.787, 5.498, .081  
 4.02, 3.9, 8.787, 5.485, .081  
 4.12, 4, 8.787, 5.472, .081  
 4.22, 4.1, 8.787, 5.459, .081  
 4.32, 4.2, 8.787, 5.446, .081  
 4.42, 4.3, 8.787, 5.433, .081  
 4.52, 4.4, 8.787, 5.42, .081  
 4.62, 4.5, 8.787, 5.407, .081  
 4.72, 4.6, 8.787, 5.394, .081  
 4.82, 4.7, 8.787, 5.381, .081  
 4.92, 4.8, 8.787, 5.368, .081  
 5, 4.88, 8.787, 5.357, .081

modout - Completel.txt

"Discharge/Tributary Input Data for Segment 4"  
"Flow", "cBOD5", "TKN", "DO", "Temp"  
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
.07, 30, 9, .5, 20

"Incremental Flow Input Data for Segment 4"  
"Flow", "cBOD5", "TKN", "DO", "Temp"  
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
0, 2, 0, .8793, 13.5

"Hydraulic Information for Segment 4"  
"Length", "Width", "depth", "velocity"  
"(mi)", "(ft)", "(ft)", "(ft/sec)"  
3, 760.001, .886, .842

"Initial Mix Values for Segment 4"  
"Flow", "DO", "cBOD", "nBOD", "DOsat", "Temp"  
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"  
567.19, 8.787, 5.366, .084, 9.77, 13.59386

"Rate Constants for Segment 4. - (All units Per Day)"  
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"  
.5, .373, 3, 2.577, .15, .092, 0, 0

"Output for Segment 4"  
"Segment starts at OUTFALL 028"  
"Total", "Segm."  
"Dist.", "Dist.", "DO", "cBOD", "nBOD"  
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"  
5, 0, 8.787, 5.366, .084  
5.1, .1, 8.791, 5.352, .084  
5.2, .2, 8.793, 5.338, .084  
5.3, .3, 8.793, 5.324, .084  
5.4, .4, 8.793, 5.31, .084  
5.5, .5, 8.793, 5.296, .084  
5.6, .6, 8.793, 5.282, .084  
5.7, .7, 8.793, 5.268, .084  
5.8, .8, 8.793, 5.254, .084  
5.9, .9, 8.793, 5.24, .084  
6, 1, 8.793, 5.226, .084  
6.1, 1.1, 8.793, 5.212, .084  
6.2, 1.2, 8.793, 5.198, .084  
6.3, 1.3, 8.793, 5.184, .084  
6.4, 1.4, 8.793, 5.17, .084  
6.5, 1.5, 8.793, 5.156, .084  
6.6, 1.6, 8.793, 5.142, .084  
6.7, 1.7, 8.793, 5.128, .084  
6.8, 1.8, 8.793, 5.114, .084  
6.9, 1.9, 8.793, 5.1, .084  
7, 2, 8.793, 5.086, .084  
7.1, 2.1, 8.793, 5.072, .084  
7.2, 2.2, 8.793, 5.058, .084  
7.3, 2.3, 8.793, 5.044, .084  
7.4, 2.4, 8.793, 5.03, .084  
7.5, 2.5, 8.793, 5.016, .084  
7.6, 2.6, 8.793, 5.002, .084  
7.7, 2.7, 8.793, 5, .084  
7.8, 2.8, 8.793, 5, .084  
7.9, 2.9, 8.793, 5, .084  
8, 3, 8.793, 5, .084

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0  
Model Input File for the Discharge  
to NEW RIVER.

File Information

File Name: I:\kaharlow\Raap - VA0000248\VA0000248\_10\_Reissuance\Technical\ID  
Date Modified: April 16, 2010

Water Quality Standards Information

Stream Name: NEW RIVER  
River Basin: New River Basin  
Section: 2a  
Class: IV - Mountainous Zones Waters  
Special Standards: v,PWS

Background Flow Information

Gauge Used: Outfall 004  
Gauge Drainage Area: 2791 Sq.Mi.  
Gauge 7Q10 Flow: 559 MGD  
Headwater Drainage Area: 2791 Sq.Mi.  
Headwater 7Q10 Flow: 559 MGD (Net; includes Withdrawals/Discharges)  
Withdrawal/Discharges: 0 MGD  
Incremental Flow in Segments: 0.2002866 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 13.5 Degrees C  
Background cBOD5: 2 mg/l  
Background TKN: 0 mg/l  
Background D.O.: 8.800588 mg/l

Model Segmentation

Number of Segments: 4  
Model Start Elevation: 1700 ft above MSL  
Model End Elevation: 1660 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0  
Model Input File for the Discharge  
to NEW RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.  
Discharge Name: OUTFALL 029  
VPDES Permit No.: 0000248

Discharger Flow Information

Flow: 1.57 MGD  
cBOD5: 60 mg/l  
TKN: 0 mg/l  
D.O.: 7 mg/l  
Temperature: 20 Degrees C

Geographic Information

Segment Length: 0.1 miles  
Upstream Drainage Area: 2791 Sq.Mi.  
Downstream Drainage Area: 2791 Sq.Mi.  
Upstream Elevation: 1700 Ft.  
Downstream Elevation: 1699.5 Ft.

Hydraulic Information

Segment Width: 500 Ft.  
Segment Depth: 1.472 Ft.  
Segment Velocity: 1.179 Ft./Sec.  
Segment Flow: 560.57 MGD  
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular  
Character: Mostly Straight  
Pool and Ripple: No  
Bottom Type: Sand  
Sludge: None  
Plants: None  
Algae: None

REGIONAL MODELING SYSTEM VERSION 4.0  
Model Input File for the Discharge  
to NEW RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition: A discharge enters.  
Discharge Name: OUTFALL 026  
VPDES Permit No.: 0000248

Discharger Flow Information

Flow: 1 MGD  
cBOD5: 30 mg/l  
TKN: 13.6 mg/l  
D.O.: 5 mg/l  
Temperature: 20 Degrees C

Geographic Information

Segment Length: 0.02 miles  
Upstream Drainage Area: 2791 Sq.Mi.  
Downstream Drainage Area: 2791 Sq.Mi.  
Upstream Elevation: 1699.5 Ft.  
Downstream Elevation: 1699.4 Ft.

Hydraulic Information

Segment Width: 600.001 Ft.  
Segment Depth: 1.016 Ft.  
Segment Velocity: 0.922 Ft./Sec.  
Segment Flow: 561.57 MGD  
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular  
Character: Mostly Straight  
Pool and Riffle: No  
Bottom Type: Sand  
Sludge: None  
Plants: None  
Algae: None

REGIONAL MODELING SYSTEM VERSION 4.0  
Model Input File for the Discharge  
to NEW RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition: A discharge enters.  
Discharge Name: OUTFALL 007  
VPDES Permit No.: 0000248

Discharger Flow Information

Flow: 5.55 MGD  
cBOD5: 24 mg/l  
TKN: 0 mg/l  
D.O.: 7 mg/l  
Temperature: 20 Degrees C

Geographic Information

Segment Length: 4.88 miles  
Upstream Drainage Area: 2791 Sq.Mi.  
Downstream Drainage Area: 2791 Sq.Mi.  
Upstream Elevation: 1699.4 Ft.  
Downstream Elevation: 1675 Ft.

Hydraulic Information

Segment Width: 599.999 Ft.  
Segment Depth: 1.025 Ft.  
Segment Velocity: 0.927 Ft./Sec.  
Segment Flow: 567.12 MGD  
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular  
Character: Mostly Straight  
Pool and Ripple: No  
Bottom Type: Sand  
Sludge: None  
Plants: None  
Algae: None

REGIONAL MODELING SYSTEM VERSION 4.0  
Model Input File for the Discharge  
to NEW RIVER.

Segment Information for Segment 4

Definition Information

Segment Definition: A discharge enters.  
Discharge Name: OUTFALL 028  
VPDES Permit No.: 0000248

Discharger Flow Information

Flow: 0.07 MGD  
cBOD5: 30 mg/l  
TKN: 9 mg/l  
D.O.: 5 mg/l  
Temperature: 20 Degrees C

Geographic Information

Segment Length: 3 miles  
Upstream Drainage Area: 2791 Sq.Mi.  
Downstream Drainage Area: 2791 Sq.Mi.  
Upstream Elevation: 1675 Ft.  
Downstream Elevation: 1660 Ft.

Hydraulic Information

Segment Width: 760.001 Ft.  
Segment Depth: 0.886 Ft.  
Segment Velocity: 0.842 Ft./Sec.  
Segment Flow: 567.19 MGD  
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular  
Character: Mostly Straight  
Pool and Ripple: No  
Bottom Type: Sand  
Sludge: None  
Plants: None  
Algae: None

# **Excerpt from 1979 Fact Sheet**

TABLE I. EFFLUENT LIMITATIONS

012

( ) Final Limitation

( ) Interim Limitation

Effective Dates: From \_\_\_\_\_

To \_\_\_\_\_

## TNT WASTE TREATMENT PLANT

Parameter	BASIS				BASED ON			MONITORING	
	Effluent Guidelines			Best Engr. Judg-ment	Water * Quality Stds.	Multiplier	Production	Permit Limit	Sample Type
	BPT (Prop) (Final)	BAT (Prop) (Final)	NSPS (Prop) (Final)						
Oxidized Nitrogen	—	—	—	*	—	—	—	50/143 kg/d 39/21 mg/l 3443/2495 kg/d 1400/1136 mg/l 24 hr comp	24 hr comp 1/month
Sulfate	—	—	—	*	—	—	—	3443/2495 kg/d 1400/1136 mg/l 24 hr comp	24 hr comp 1/month
TNT + Anisotoluenes	—	—	—	<del>*</del>	—	—	—	1400/1136 mg/l 0.811/1.37 kg/d	
TNT + NITROBENZES	—	—	—	*	—	—	—	0.5/0.75 kg/d 91/1406 kg/d	24 hr comp 1/month
COD	—	—	—	*	—	—	—	50/233 mg/l 33°C summer 10°C winter	24 hr comp 1/month
Temperature	—	—	—	*	<del>*</del>	—	—	Recorded can't	Recorded can't
pH	—	—	—	—	5	—	—	6.0 - 9.0	Recorded can't

- \*1. Per 208 Plan and date \_\_\_\_\_
2. Per 303(C) Plan and date \_\_\_\_\_
3. Per EPA and date \_\_\_\_\_
4. Per 401 Certification and date \_\_\_\_\_
5. Other 37 rpm standard

\*See Attachment #1

ATTACHMENT 1

1. Outfall 004 - This is an open ditch which prior to the finish of Project MCA33.10A received several small contaminated process and drainage streams. The parameters listed are those for which testing was done prior to the removal of these streams. As the only water to be contained in this ditch is to be storm and spring flows, a one-year testing program is included to provide assurance that all contaminated water is removed.
2. Outfall 401 - This is the Oleum manufacture waste acid treatment plant. Processes employed are equalization, neutralization, pH adjustment and clarification with vacuum filtration for sludge dewatering. TSS limits are based on limits normally to be expected in a solids containing system with simple settling. Sulfate limits are based on the solubility limit of calcium sulfate as this is the form in which almost all of the SO<sub>4</sub> in the system is expected to be. It is the judgment of the staff that as no provision is made for the removal of soluble sulfate the minimum amount which can be listed as a permit limit is the solubility of the compound. As calcium sulfate normally exists in one of three forms with varying solubilities, it was necessary to choose one form as the one on which to base the limit. Of the three forms (anhydrous, 2 H<sub>2</sub>O and, 1/2 H<sub>2</sub>O). It is obvious that the anhydrous was least likely to be predominant. Of the remaining, the two water hydrate was the lesser soluble and was chosen as the more conservative guess. The limits are thus based on the solubility of CaSO<sub>4</sub>.2H<sub>2</sub>O in water at 20°C. The solubility of this species is 2410 mg/l. Of this approximately 57% or 1370 mg/l is contributed by the sulfate radical. All sulfate results are to be reported as SO<sub>4</sub>. As the solids in this system are almost exclusively calcium sulfate, it was felt that some provision must be made to account for the calcium sulfate existing as suspended matter. It was decided that for the sake of simplicity all TSS would be assumed to be SO<sub>4</sub> and thus the TSS limit was added to the sulfate limit. This was in all cases a negligible addition. All quantity limits were based on the concentration limits listed and a flow figure of 0.25 mg/d which was supplied by Arsenal personnel as the design flow for this facility.
3. Outfall 005 (Cooling Water) - This outfall previously carried the effluent from the C-line waste acid treatment plant. Upon completion of Project MCA 972.550, the C-line waste acid treatment plant will be abandoned and all waste diverted to the main waste acid treatment plant associated with Discharge 007. To insure that all contaminated streams have been removed from this discharge, the parameters: oxidized nitrogen, sulfate, BOD and COD, are to be monitored for a period of one year. No limits are included on the permit as the tests are to be conducted only for the purpose of verification. Temperature limits are based on a best estimation of the temperature of flows currently being discharged. Special Condition 1 attached to the permit requires that these temperature limits be investigated and modified if necessary.

4. Outfall 006 (Main Plant General Purpose Sewer) - This outfall previously contained a number of contaminated streams of varying origins. With the completion of several projects throughout the plant, all contaminated waste streams will be eliminated leaving only non-contact cooling water from power house and water treatment plant raw water overflow-OS streams associated with plant processes. The raw water overflow contains only untreated unchanged river water with no additives whatsoever. In addition to these process streams there is also storm runoff and spring water. BOD, COD, and oxidized nitrogen testing is included on the requirements for this discharge to provide assurance that all contaminated streams have been removed. Temperature limitations are based on the best available data existing at the time of the permit drafting. Special Condition No. 1 requires that a study be done on this discharge to determine if these limits should be changed.
5. Outfall 007 (Main Plant Acid Treatment Plant) - BOD and COD carrying streams will be removed from this outfall by MCA 33.10A. Testing requirement is to give assurances that no such stream still exists. TSS limits are based on 30 and 45 mg/l and a flow rate of 7.0 MGD which is the best estimate by Arsenal personnel for the future flow rates. Sulfate quantities limits are based on 1400 and 1415 mg/l as discussed under Outfall 401. Oxidized nitrogen quantities are based on a 85% reduction of the NO<sub>3</sub> quantities determined to be in the raw stream at mobilization production rates. It was previously determined that the segment of the New River into which this discharge flows is not water quality limiting with respect to nitrate and thus effluent limitations apply. As no guidelines for nitrate removal exist, Radford Arsenal with the concurrence of EPA and the Virginia Water Control Board decided that an 85% removal rate should be the target, pending a BPT definition. With this in mind, RAAP personnel designed a system to produce this level of effluent nitrate. Pertinent data has been reviewed by the staff. The RAAP staff is satisfied that these levels will be met. No nitrate removal facilities as such are involved as the reduction in effluent in the quantity is accomplished by recycle in the production process. No NO<sub>3</sub> concentration limit is given as most NO<sub>3</sub> exists in this system as calcium nitrate which is soluble in water in the range of 1800 g/l. Due to the uncertainty with the permit limits as stated in this permit, Special Condition No. 2 is added to this discharge which will allow for an evaluation of the efficiency of this system during a certain period after which the permit limits may be modified. Proper temperature limits are also somewhat in question and for this reason Special Condition No. 1 applies which will require RAAP to perform a temperature survey after which temperature limits may also be modified.
6. Outfall 012 (TNT Waste Treatment Plant) - Oxidized nitrogen, TNT, and COD limits are based on the best estimates for the capability of the proposed treatment plant. The final limits were derived from the estimated full mobilization loadings with 85% removal. Sulfate limits were determined as discussed under Outfall 401. Special Condition No. 2 is applicable to this discharge and thus an efficiency study will be undertaken during the first year of actual operation to determine if these limits are correct.

The temperature survey in accordance with Special Condition No. 1 will also be conducted. COD Quantity limits are based on a concentration in the effluent of 52 mg/l average and 233 mg/l maximum and a flow rate of 0.46 MGD. The flow figure was arrived at by back calculating from oxidized nitrogen and TNT quantities.

7. Outfall 013 - This discharge is associated with a drainage ditch in the TNT manufacturing area which was found some years ago to be carrying a measured pollutant load. However, no pollutant quantities have been detected in recent years. It is proposed to sample this discharge with a higher than previously required frequency and if no unusual levels of pollutants are found during a 6-month period the discharge will be removed from the permit.
8. Outfall 014 (Inert Gas Plant Cooling Water) - The temperature limits on this discharge are based on best estimate by Arsenal personnel of actual temperatures. Special Condition No. 1 applies in this case which will require a study to be performed to determine if these limits are applicable.
9. Outfall 015 (Non-Contact Cooling Water) - Temperature limits for this discharge are based on past records and best estimate of temperature by Arsenal personnel. As the limit is not greater than stream standards, no Special Condition No. 1 type of survey is necessary.
10. Outfall 017 (Runoff from the Open Burning Area) - This outfall is included on the permit as there is a potential for contaminated discharge from this area. To date no discharge has ever been reported from this area. Testing requirement is included; therefore, for information proposes only should discharge occur.
11. Outfall 023 (Compressor House Cooling Water) - The temperature limit of 36°C is based on a best estimate by Arsenal personnel. Special Condition No. 1 applies in this case.
12. Outfall 026 (Main Plant Sewage Treatment Plant) - BOD and TSS values are based on standard secondary treatment definition for sewage treatment plants. Quantity limits are calculated with a flow of 1.0 MGD. Chlorine residual limits are based on practices currently in use in the State of Virginia.
13. Outfall 028 (horseshoe Area Waste Treatment Plant - All limits determined the same as in Outfall 026. Flow limits of 0.075 MGD was used for calculation of quantity limits.

14. Outfall 029 (Main Plant Biological Waste Treatment Plant) - BOD and COD limits are based on 85% removal of the estimated loading on the plant. Oxidized nitrogen loadings are unsure at this time and so are not limited. Special Condition No. 2 calling for an efficiency survey to establish limits applies to this discharge. TSS limits are based on 85% removal of TSS loading as shown in Table II of the April 25, 1978, design capacity submittal from Col. Watts. This, as are all limits on this discharge is a tentative figure pending resolution of Special Condition No. 2.

**Attachment G**

**TMP Justification Memorandum**

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

WEST CENTRAL REGIONAL OFFICE

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: RFAAP VA0000248 - TMP Justification

TO: Deborah DeBiasi - OPS

FROM: Kevin Harlow

DATE: April 8, 2010

Revised facility information along with included table showing historic TMP results are attached.

**Outfall 005:** The current mode of operation is to discharge only cooling water, cooling tower blowdown and storm water, and potentially wastewater from the oleum plant. The oleum plant is in standby mode and will take considerable effort to make it active. Occasionally, spills from tank dikes have found their way into this outfall. Discharges from this outfall meet the applicability criteria in the guidance to flows in excess of 50,000 gpd. No toxicity was observed during the current permit. Annual acute biological testing should be continued in the permit. The species used should be alternated between C. dubia and P. promelas. If the oleum plant becomes active, quarterly testing with both species should resume.

**Outfall 006:** No major changes in the sources of effluent at this outfall. Discharges from this outfall meet the applicability criteria in the guidance due to flows in excess to 50,000 gpd. An acute toxicity limit of 1.0 TUa was placed into the permit during the 2005 permit reissuance. The facility did not have any trouble meeting achieving compliance with this limit. Chronic toxicity data using P. promelas showed some toxicity but the WETLIM10 and STATS.EXE output showed that the 1.0 TUa was the most restrictive limit and that a chronic toxicity limit is not needed. Annual chronic tests using Pimephales promelas will also continue.

**Outfall 007:** No major changes in the sources of wastewater at this outfall. All waste acid is directed to the A-B line treatment system and this outfall. This outfall has had an effective acute WET limit since 1994. The 8.0 TUa limit was corrected in the 2005 permit reissuance to a 6.6 TUa limit. The facility did not have any trouble meeting this new limit during the compliance schedule. Chronic toxicity data using C. dubia showed some toxicity but the WETLIM10 and STATS.EXE output showed that the 6.6 TUa was the most restrictive limit and that a chronic toxicity limit is not needed. Continued chronic testing is also required since the IWC at 7Q10 exceeds 1%.

**Outfall 014:** Since cooling water was removed from this outfall in 1992, shortly after the permit was last reissued, this discharge has been comprised of storm water and spring water. A contaminated spring is downgradient of a major fuel oil spill that occurred in the early 1970s. A petroleum odor was still be detected in this area during a 2000 site visit. The contaminated spring was determined to be infiltrating a collapsed pipeline in 2000. The pipeline was subsequently repaired excluding the contaminated spring. Toxicity testing during the 2005 permit did not exhibit toxicity. However, given the IWC=100%, continue acute toxicity testing alternating between P. promelas and C. dubia is

to continue.

**Outfall 024:** There has been virtually no flow from this outfall for the past five years. If discharge does commence, the IWC is estimated to be about 0.05%. Since there is little chance that toxics from manufacturing operations would be discharged to this outfall, there is no TMP requirement.

**Outfall 026 & 028:** Toxicity from chlorine was evident at these outfalls before final chlorine limits were placed in the permit. In addition, there is a chance that toxics from manufacturing or laboratory operations could be routed to these STPs. Since dechlorination has been added to reduce chlorine toxicity, annual compliance monitoring is required.

**Outfall 029:** There are no major changes in the sources of effluent at this outfall. A WET limit became effective in 1994. No tests have failed since a seven million gallon equalization basin has been in use. Ceriodaphnia dubia was chosen as the most sensitive species in 1994. Small changes in the manufacturing formulations have been made and will probably continue in the future. WET testing will continue with the most sensitive species C. dubia. Once each year both species should be tested to verify that manufacturing changes have not resulted in vertebrate toxicity.

## **SUMMARY OF TMP REQUIREMENTS:**

005: Annual acute tests on 24 hour composite samples during dry weather. Alternate between Pimephales promelas and Ceriodaphnia dubia. If the oleum plant becomes active, quarterly acute and chronic testing with both species should be initiated.

006: Quarterly acute tests on 24 hour composite samples using Pimephales promelas. Both species should be used once each year to verify the most sensitive species. Annual chronic tests on 24 hour composite samples using P. Promelas.

007: Quarterly acute tests on 24 hour composite samples with a WET limit using Ceriodaphnia dubia. Both species should be used once each year to verify the most sensitive species. Annual chronic testing using Ceriodaphnia dubia.

014: Annual acute on 24 hour composite samples alternating between Pimephales promelas and Ceriodaphnia dubia.

024: Quarterly acute tests on 24 hour composite samples with both C. dubia and P. promelas upon commencement of discharge.

026: Annual acute on 24 hour composite samples alternating between Pimephales promelas and Ceriodaphnia dubia.

028: Annual acute tests on 24 hour composite samples alternating between Pimephales promelas and Ceriodaphnia dubia.

029: Quarterly acute tests on 24 hour composite samples with a WET limit using Ceriodaphnia dubia. Both Species should be used once each year to verify the most sensitive species.

**VA0000248 - RAAP**

**Acute Toxicity Test Results page 1 of 2**

OUT FALL	EVENT	DATE BEGIN	DATE END	VERT.	INVERT.	LC50 (%)	TUa	NOAEC (%)	SURV. IN 100%
7	ST ANNUAL	7/20/2005	7/22/2005	P. promelas		>100	<1		95
7	2nd Annual	7/19/2006	7/21/2006	P. promelas		>100	<1		100
7	3rd Annual	7/11/2007	7/13/2007	P. promelas		>100	<1		100
7	4th Annual	7/9/2008	7/11/2008	P. promelas		>100	<1		90
7	5th Annual	7/8/2009	7/8/2009	P. promelas		>100	<1		100
7	ST QUARTER	7/20/2005	7/22/2005		C. dubia	40.55	2.47		0
7	2nd Quarter	10/5/2005	10/7/2005		C. dubia	51.27	1.95		25
7	3rd Quarter	1/11/2006	1/13/2006		C. dubia	32.8	3.05		15
7	4th Quarter	4/12/2006	4/14/2006		C. dubia	76.01	1.32		20
7	5th Quarter	7/19/2006	7/21/2006		C. dubia	90.87	1.1		40
7	6th Quarter	10/11/2006	10/13/2006		C. dubia	48.28	2.07		10
7	7th Quarter	1/10/2007	1/12/2007		C. dubia	41.2	2.43		0
7	8th Quarter	4/11/2007	4/13/2007		C. dubia	>100	<1		45
7	9th Quarter	7/11/2007	7/13/2007		C. dubia	62.11	1.61		25
7	10th Quarter	10/3/2007	10/5/2007		C. dubia	>100	<1		80
7	11th Quarter	1/9/2008	1/11/2008		C. dubia	65.91	1.52		15
7	12th Quarter	4/9/2008	4/11/2008		C. dubia	69.44	1.44		35
7	13th Quarter	7/9/2008	7/11/2008		C. dubia	>100	<1		95
7	14th Quarter	10/8/2008	10/10/2008		C. dubia	99.9	1		50
7	15th Quarter	1/14/2009	1/16/2009		C. dubia	46.93	2.13		0
7	16th Quarter	4/8/2009	4/10/2009		C. dubia	75.77	1.32		30
7	17th Quarter	7/8/2009	7/10/2009		C. dubia	84.68	1.18		?
7	18th Quarter	10/7/2009	10/9/2009		C. dubia	47.73	2.1		0
7	19th Quarter	1/13/2010	1/15/2010		C. dubia	42.04	2.38		0
29	ST ANNUAL	7/20/2005	7/22/2005	P. promelas		>100	<1		100
29	2nd Annual	7/19/2006	7/21/2006	P. promelas		>100	<1		95
29	3rd Annual	7/11/2007	7/13/2007	P. promelas		>100	<1		100
29	4th Annual	7/9/2008	7/11/2008	P. promelas		>100	<1		100
29	5th Annual	7/8/2009	7/10/2009	P. promelas		>100	<1		90
29	ST QUARTER	7/20/2005	7/22/2005		C. dubia	>100	<1		100
29	2nd Quarter	10/5/2005	10/7/2005		C. dubia	>100	<1		95
29	3rd Quarter	1/11/2006	1/13/2006		C. dubia	>100	<1		95
29	4th Quarter	4/12/2006	4/14/2006		C. dubia	>100	<1		100
29	5th Quarter	7/19/2006	7/21/2006		C. dubia	>100	<1		100
29	6th Quarter	10/11/2006	10/13/2006		C. dubia	>100	<1		95
29	7th Quarter	1/10/2007	1/12/2007		C. dubia	>100	<1		75
29	8th Quarter	4/11/2007	4/13/2007		C. dubia	>100	<1		100
29	9th Quarter	7/11/2007	7/13/2007		C. dubia	>100	<1		95
29	10th Quarter	10/3/2007	10/5/2007		C. dubia	>100	<1		95
29	11th Quarter	1/9/2008	1/11/2008		C. dubia	>100	<1		90
29	12th Quarter	4/9/2008	4/11/2008		C. dubia	>100	<1		100
29	13th Quarter	7/9/2008	7/11/2008		C. dubia	>100	<1		100
29	14th Quarter	10/8/2008	10/10/2008		C. dubia	>100	<1		100
29	15th Quarter	1/14/2009	1/16/2009		C. dubia	>100	<1		100
29	16th Quarter	4/15/2009	4/17/2009		C. dubia	>100	<1		100
29	17th Quarter	7/8/2009	7/8/2009		C. dubia	>100	<1		100
29	18th Quarter	10/7/2009	10/9/2009		C. dubia	>100	<1		100
29	19th Quarter	1/20/2010	1/22/2010		C. dubia	>100	<1		95

**VA0000248 - RAAP****Acute Toxicity Test Results page 2 of 2**

OUT FALL	EVENT	DATE BEGIN	DATE END	VERT.	INVERT	LC50 (%)	TUa	NOAE C	SURV. IN 100%
5	1ST ANNUAL	7/20/2005	7/22/2005	P. promelas		>100	<1		100
5	3rd Annual	7/11/2007	7/13/2007	P. promelas		>100	<1		95
5	5th Annual	7/8/2009	7/10/2009	P. promelas		>100	<1		100
5	1ST ANNUAL	7/20/2005	7/22/2005		C. dubia	>100	<1		100
5	2nd Annual	7/19/2006	7/21/2006		C. dubia	>100	<1		100
5	4th Annual	7/9/2008	7/11/2008		C. dubia	>100	<1		100
6	1ST QUARTER	7/20/2005	7/22/2005	P. promelas		>100	<1	100	95
6	2nd Quarter	10/5/2005	10/7/2005	P. promelas		>100	<1	100	100
6	3rd Quarter	1/11/2006	1/13/2006	P. promelas		>100	<1	100	100
6	4th Quarter	4/13/2006	4/15/2006	P. promelas		>100	<1	100	100
6	5th Quarter	7/19/2006	7/21/2006	P. promelas		>100	<1	100	100
6	6th Quarter	10/11/2006	10/13/2006	P. promelas		>100	<1	100	100
6	7th Quarter	1/10/2007	1/12/2007	P. promelas		>100	<1	100	100
6	8th Quarter	4/11/2007	4/13/2007	P. promelas		>100	<1	100	100
6	9th Quarter	7/11/2007	7/13/2007	P. promelas		>100	<1	100	100
6	10th Quarter	10/3/2007	10/5/2007	P. promelas		>100	<1	100	100
6	11th Quarter	1/9/2008	1/11/2008	P. promelas		>100	<1	100	100
6	12th Quarter	4/9/2008	4/11/2008	P. promelas		>100	<1	100	100
6	13th Quarter	7/9/2008	7/11/2008	P. promelas		>100	<1	100	100
6	14th Quarter	10/8/2008	10/10/2008	P. promelas		>100	<1	100	100
6	15th Quarter	1/7/2009	1/9/2009	P. promelas		>100	<1	100	100
6	16th Quarter	4/8/2009	4/10/2009	P. promelas		>100	<1	100	100
6	17th Quarter	7/8/2009	7/10/2009	P. promelas		>100	<1	100	100
6	18th Quarter	10/7/2009	10/9/2009	P. promelas		>100	<1	100	95
6	19th Quarter	1/13/2010	1/15/2010	P. promelas		>100	<1	100	95
14	1ST ANNUAL	7/20/2005	7/22/2005	P. promelas		>100	<1		100
14	3rd Annual	7/18/2007	7/20/2007	P. promelas		>100	<1		100
14	5th Annual	7/8/2009	7/10/2009	P. promelas		>100	<1		95
14	2nd Annual	7/21/2006	7/23/2006		C. dubia	>100	<1		100
14	4th Annual	7/11/2008	7/13/2008		C. dubia	>100	<1		95
26	1ST ANNUAL	7/20/2005	7/22/2005	P. promelas		>100	<1		100
26	3rd Annual	7/11/2007	7/13/2007	P. promelas		>100	<1		95
26	5th Annual	7/8/2009	7/10/2009	P. promelas		>100	<1		100
26	2nd Annual	7/21/2006	7/23/2006		C. dubia	>100	<1		100
26	4th Annual	7/18/2008	7/20/2008		C. dubia	>100	<1		100

**VA0000248 - RAAP**

**Chronic Toxicity Test Results**

OUT FALL	EVENT	DATE BEGIN	DATE END	VERT.	INVERT.	NOEC- Growth	LOEC- Growth	IC25- Growth	TUc- Growth	PMSD	LC50- Survival	NOEC- Survival	LOEC- Survival	TUc- Survival
6	1st Annual	7/18/2005	7/25/2005	P. promelas		16	100	>100	6.25	10.41	>100	100	>100	1
6	2nd Annual	7/17/2006	7/24/2006	P. promelas		100	>100	>100	1	15.11	>100	100	100	1
6	3rd Annual	7/9/2007	7/16/2007	P. promelas		16	100	82.93	6.25	16.31	>100	100	>100	1
6	4th Annual	7/7/2008	7/14/2008	P. promelas		16	100	>100	6.25	11.75	>100	100	>100	1
6	5th Annual	7/6/2009	7/13/2009	P. promelas		100	>100	>100	1	13.82	>100	100	>100	1
7	1st Annual	7/18/2005	7/25/2005		C. dubia	10	100	22.08	10	28.69	68.13	10	100	10
7	2nd Annual	7/17/2006	7/24/2006		C. dubia	10	100	31.26	10	24.16	100	10	100	10
7	3rd Annual	7/9/2007	7/16/2007		C. dubia	10	100	25.67	10	20.15	>100	10	100	10
7	4th Annual	7/7/2008	7/14/2008		C. dubia	10	100	32.16	10	27.63	>100	10	100	10
7	5th Annual	7/6/2009	7/13/2009		C. dubia	10	100	29.59	10	21.37	>100	10	100	10

# NPDES Permit Rating Work Sheet

NPDES NO: VA0000248

Facility Name:

Radford Army Ammunition Plant

City: Radford

Receiving Water: New River

Reach Number: VAW-N22R

- Regular Addition
- Discretionary Addition
- Score change, but no status change
- Deletion

**Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?**

1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

YES: score is 600 (stop here)     NO (continue)

**Is this permit for a municipal separate storm sewer serving a population greater than 100,000?**

YES: score is 700 (stop here)  
 NO (continue)

## FACTOR 1: Toxic Pollutant Potential

PCS SIC Code:        Primary SIC Code: 2892

Other SIC Codes: 2819 2823 2873 4911

Industrial Subcategory Code:          (Code 000 if no subcategory)

**Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one**

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
<input type="checkbox"/> No process waste streams	0	0	<input type="checkbox"/> 3.	3	15	<input type="checkbox"/> 7.	7	35
<input type="checkbox"/> 1.	1	5	<input type="checkbox"/> 4.	4	20	<input checked="" type="checkbox"/> 8.	8	40
<input type="checkbox"/> 2.	2	10	<input type="checkbox"/> 5.	5	25	<input type="checkbox"/> 9.	9	45
			<input type="checkbox"/> 6.	6	30	<input type="checkbox"/> 10.	10	50

Code Number Checked:         

Total Points Factor 1:       

## FACTOR 2: Flow/Stream Flow Volume (Complete Either Section A or Section B; check only one)

### Section A--Wastewater Flow Only Considered

Wastewater Type (See Instructions)	Code	Points	Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentra- tion at Receiving Stream Low Flow	Code	Points
Type I: Flow < 5 MGD	11	0				
Flow 5 to 10 MGD	12	10				
Flow > 10 to 50 MGD	13	20				
Flow > 50 MGD	14	30	Type I/III:	< 10%	41	0
Type II: Flow < 1 MGD	21	10				
Flow 1 to 5 MGD	22	20				
Flow > 5 to 10 MGD	23	30				
Flow > 10 MGD	24	50				
Type III: Flow < 1 MGD	31	0	Type II:	< 10%	51	0
Flow 1 to 5 MGD	32	10				
Flow > 5 to 10 MGD	33	20				
Flow > 10 MGD	34	30				

Code Checked from Section A or B:       

Total Points Factor 2:

**FACTOR 3: Conventional Pollutants**  
*(only when limited by the permit)*

A. Oxygen Demanding Pollutant: (check one)	<input type="checkbox"/> BOD	<input checked="" type="checkbox"/> COD	<input type="checkbox"/> Other:
Permit Limits: (check one)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Code      Points
		< 100 lbs/day	1      0
		100 to 1000 lbs/day	2      5
		>1000 to 3000 lbs/day	3      15
	<input checked="" type="checkbox"/>	>3000 lbs/day	4      20

Code Checked: 4Points Scored: 20

## B. Total Suspended Solids (TSS)

Permit Limits: (check one)		Code	Points
	<input type="checkbox"/>	1	0
	<input type="checkbox"/>	2	5
	<input type="checkbox"/>	3	15
	<input checked="" type="checkbox"/>	4	20

Code Checked: 4Points Scored: 20C. Nitrogen Pollutant: (check one)  Ammonia  Other: Oxidized Nitrogen

Permit Limits: (check one)		Code	Points
	<input type="checkbox"/>	1	0
	<input type="checkbox"/>	2	5
	<input type="checkbox"/>	3	15
	<input checked="" type="checkbox"/>	4	20

Code Checked: 4Points Scored: 20Total Points Factor 3: 60**FACTOR 4: Public Health Impact**

*Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.*

YES (if yes, check toxicity potential number below)  NO (if no, go to Factor 5)

Determine the human health toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column – check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
<input type="checkbox"/> No process waste streams	0	0	<input type="checkbox"/> 3.	3	0	<input type="checkbox"/> 7.	7	15
<input type="checkbox"/> 1.	1	0	<input type="checkbox"/> 4.	4	0	<input checked="" type="checkbox"/> 8.	8	20
<input type="checkbox"/> 2.	2	0	<input type="checkbox"/> 5.	5	5	<input type="checkbox"/> 9.	9	25
			<input type="checkbox"/> 6.	6	10	<input type="checkbox"/> 10.	10	30

Code Number Checked: 08Total Points Factor 4: 20

# NPDES Permit Rating Work Sheet

NPDES No.: VA0000248

## FACTOR 5: Water Quality Factors

- A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge?

	Code	Points
<input checked="" type="checkbox"/> Yes	1	10
<input type="checkbox"/> No	2	0

- B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

	Code	Points
<input checked="" type="checkbox"/> Yes	1	0
<input type="checkbox"/> No	2	5

- C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

	Code	Points
<input checked="" type="checkbox"/> Yes	1	10
<input type="checkbox"/> No	2	0

Code Number Checked: A 1      B 1      C 1  
 Points Factor 5: A 1 0 + B 0 + C 10 = 2 0 TOTAL

## FACTOR 6: Proximity to Near Coastal Waters N/A

- A. Base Score: Enter flow code here (from Factor 2):

Enter the multiplication factor that corresponds to the flow code:       

Check appropriate facility HPRI Code (from PCS):

HPRI #	Code	HPRI Score	Flow Code	Multiplication Factor
<u>      </u>	1	20	11, 31, or 41	0.00
<u>      </u>	2	0	12, 32, or 42	0.05
<u>      </u>	3	30	13, 33, or 43	0.10
<u>      </u>	4	0	14 or 34	0.15
<u>      </u>	5	20	21 or 51 22 or 52 23 or 53 24	0.10 0.30 0.60 1.00

HPRI code checked:       

Base Score: (HPRI Score)        x (Multiplication Factor)        =        0 (TOTAL POINTS)

- B. Additional Points--NEP Program

For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

N/A

	Code	Points
<u>      </u> Yes	1	10
<u>      </u> No	2	0

- C. Additional Points--Great Lakes Area of Concern

For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see instructions)

N/A

	Code	Points
<u>      </u> Yes	1	10
<u>      </u> No	2	0

Code Number Checked: A N/A      B N/A      C N/A  
 Points Factor 5: A        + B        + C        =        0 TOTAL

# NPDES Permit Rating Work Sheet

NPDES NO: VA0000248

## SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	____ 40 ____
2	Flow/Stream Flow Volume	____ 00 ____
3	Conventional Pollutants	____ 60 ____
4	Public Health Impacts	____ 20 ____
5	Water Quality Factors	____ 20 ____
6	Proximity to Near Coastal Waters	____ 00 ____
TOTAL (Factors 1-6)		____ 140 ____

S1. Is the total score equal to or greater than 80?  Yes (Facility is a major)  No

S2. If the answer to the above question is no, would you like this facility to be discretionary major?

No

Yes (add 500 points to the above score and provide reason below:

Reason: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NEW SCORE: \_\_\_\_ 140 \_\_\_\_

OLD SCORE: \_\_\_\_ 140 \_\_\_\_

*Kevin Harlow*  
\_\_\_\_\_  
Permit Reviewer's Name

(\_\_\_\_ 540 \_\_\_\_ ) \_\_\_\_ 562 \_\_\_\_ - \_\_\_\_ 6788 \_\_\_\_  
Phone Number

\_\_\_\_\_  
March 4, 2010  
Date